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Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 1. Review of distribution and taxonomy of bats in Turkey

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Abstract. A complete list of all bat records up to now available from Turkey was compiled based on both the literary references and the original data. It is supplemented with distribution maps and brief summary of distributional and taxonomic status of each species. In total it covers 869 locality records of 31 chiropteran species: viz. *Rousettus aegyptiacus* (14 records), *Rhinolophus ferrumequinum* (104), *R. hipposideros* (65), *R. euryale* (47), *R. mehelyi* (24), *R. blasii* (29), *Myotis myotis* (63), *M. blythii* (82), *M. bechsteinii* (5), *M. nattereri* (17), *M. emarginatus* (19), *M. mystacinus* (28), *M. brandtii* (2), *M. daubentonii* (7), *M. cappaccinii* (27), *Vespertilio murinus* (3), *Eptesicus serotinus* (40), *E. bottae* (18), *Hypsugo savii* (18), *Pipistrellus pipistrellus* (72), *Pipistrellus nathusii* (6), *P. kuhlii* (45), *Nyctalus noctula* (6), *N. leisleri* (6), *N. lasiopterus* (1), *Otonycteris hemprichi* (1), *Barbastella barbastellus* s. l. (8), *Plecotus auritus* (17), *P. austriacus* (11), *Miniopterus schreibersii* (58), and *Tadarida teniotis* (26). Several other species, such as *Taphozous nudiventris*, *Asellia tridens*, *Myotis schaubi*, and *Eptesicus nilssonii*, were recorded in closest neighbourhood of the Turkish territory and are looked upon as hot candidates to the Turkish fauna. In more species, a taxonomic inhomogenity (expressed e. g. with appearance of different subspecies) over the Turkish territory was demonstrated. Based on structural differences in bat fauna, the territory of Turkey was subdivided into three major faunal regions: (1) humid coastal region (northern, western and southwestern coast), (2) arid region of Central Anatolia, Armenian Highlands and Kurdistan, and (3) southern region of Cilician lowland, Hatay and Mesopotamia (that represents a borderline between a fauna of the West-Palearctic arboreal type and that of the Saharo-Sindian eremial).

Zoogeography, distribution, taxonomy Chiroptera, Turkey, the Balkans, Middle East Palearctic region

INTRODUCTION

Biogeography of the Mediterranean region is traditionally understood to be a very attractive topics not only because of actual complexity and greatly variegated specificities of different areas of that region but also as a refugial zone for whole biota of the Western Palearctics, and, consequently, as a key region for understanding to history and evolutionary paths governing the past development of contemporary communities of Central Europe.

The territory of Turkey (Figs 1, 2) can be supposed to play a top role in these connections. With its square of 779 452 km^2, it covers as well the southern part of the Balkans, humid Pontic region and Armenian Highlands as the severe rocky-desert steppes in the Central Anatolia, the largest shoreline among the Mediterranean countries and correspondingly extensive coastal regions. It interconnects the southern offshoots of the Palearctic arboreal in the Balkans with that in Transcaucasia as well as with the steppes and deserts of the Mesopotamian lowlands. It is a region in which the earliest agricultural civilisation of the West arose and which was exposed during whole the Holocene to an impact of human civilisation. Apparently, all these factors have had to reflect also in biota of this country what makes it one of the most important region also from the zoogeographic point of view. Nevertheless, in contrast to the Levant region of the Eastern Mediterranean for which mammal fauna several extensive summaries are available (Harrison 1964, Atallah 1977, Harrison & Bates 1991, Qumsiyeh 1996), only little is available for the territory of Turkey. The present paper is hence intended to provide a basic summary of the current state of knowledge on just a one group of mammals of this country. It results of an international research project conducted by the Charles University Prague (Czech Republic) in cooperation with the Slovenian Natural History Museum Ljubljana (Slovenia) and the Thracian University Edirne (Turkey).

Introductory exposition on chiropteran biogeography of the Eastern Mediterranean, summarizing also the data obtained from the other countries of that region and providing a contextual framework to the present paper was already presented in our earlier contribution (Horáček et al. 1998).

Bat research in Turkey

Bat fauna of recent territory of the Republic of Turkey (Figs 1, 2) remained for long only poorly known. Until 1950's, all information was limited onto several occassional records mentioned in frame of general surveys often dealing with other than bat and/or Turkish topics (e. g., Danford & Alston 1877, 1880, Dobson 1878, Doria 1887, Satunin 1913, Wettstein 1926). The popularizing article by Şadoglu (1953) represents perhaps the first Turkish paper that concerns, though in general, just bats. At the beginning of sixties, Melâhat Çaglar (Istanbul) and Hermann Kahmann (Munich) started a regular field study of Turkish bats which resulted in a series of papers (Çaglar 1961a, b, c, Kahmann 1962, Kahman & Çaglar 1960) later extended in the complete lists of bat records to date available from Turkey (Çaglar 1965, 1968, 1969). In 60's and 70's, an ornithologist Hans Kumerloeve (Bonn) undertook several research trips in Turkey at which he also collected an extensive material of mammals including bats. His records were published either by him or in cooperation with Ernst von Lehman (Kumerloeve 1975, Lehmann 1966, 1969). Later, Kumerloeve (1975) compiled a very important comprehensive monograph on Turkish mammals that listed also all references and previous research efforts concerning that topic. Since the beginning of sixties, knowledge on Turkish mammals has continously been supplemented with results of research trips undertaken by German and Austrian zoologists Heinz Felten, Gerhard Storch, Dieter Kock (Frankfurt a. M.), Friederike Spitzenberger and Hans M. Steiner (Vienna), some of which spent even several years in Turkey. Several of the papers resulting of their study were focused just to distribution and systematics of bats (Felten 1971, Felten et al. 1977, Kock et al. 1972, Spitzenberger 1994, 1996, Steiner & Gaisler 1994). Since beginning of 80's, the knowledge on Turkish bats has become essentially contributed by a new generation of Turkish zoologists, particularly by Irfan Albayrak (Ankara). His papers survey primarily a number of new records he obtained even from the regions which bat fauna was practically unknown (Albayrak 1985, 1987, 1988, 1990, 1990a, 1991, 1991a, 1993, 1993a). The above mentioned list is to be supplemented with the records obtained during short term research trips by several other zoologists (Bülow 1997, Corbet & Morris 1967, Crucitti 1988, Helversen 1989, Kinzelbach 1986, Nadachovski et al. 1990, Osborn 1963, Strinati 1959, van Winden 1988) as well as with data dispersed in the papers dealing with bat parasites (Hůrka 1972, Kock 1974, 1989, Peterson et al. 1976, Peus 1976, 1978a, b, Theodor 1967).

Although the number of publications devoted to Turkish bats may seem large, in contrast to neighbouring countries, there is only one chiropteran taxon described from tooday Turkish territory, viz. *Eptesicus anatolicus* Felten, 1971. This is surprisingly few even in comparison with other mammalian orders (cf. Kumerloeve 1975), viz. Insectivora – 9 descriptions (of which 6 names are in use even nowdays), Rodentia – 54 (36), Carnivora – 7 (5), Artiodactyla – 10(4).

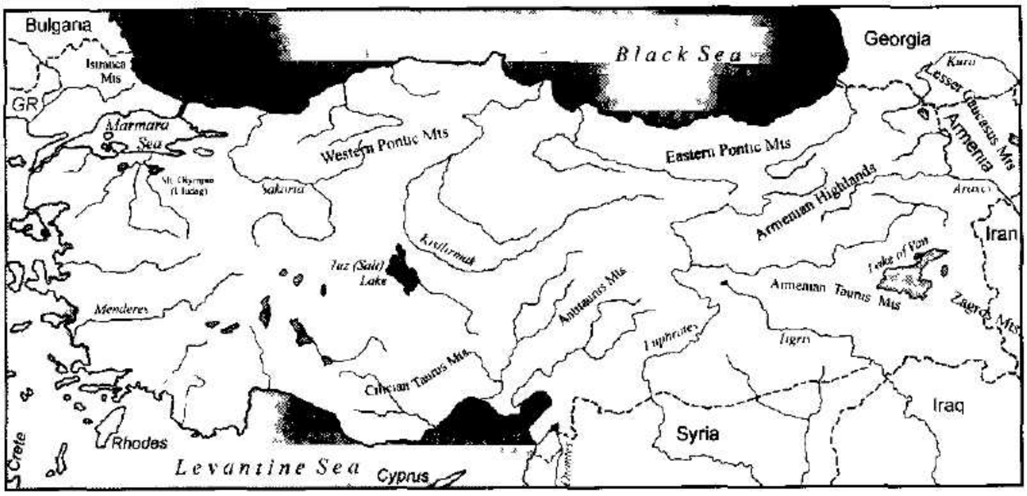

Fig. 1. A general map of Turkey, main features mentioned in text; dashed area denote territory up 1500 m a. s. l.

As evident of the above survey, the number of bat records obtained from the recent territory of Turkey grows large which calls for a complete survey of all the available records. The previous attemps in that direction are either outdated viz. Çaglar (1965, or 1968 and 1969), Kumerloeve (1975), or apparently incomplete – Dogramaci (1989) mentioned 13 bat species only. The summaries provided by Albayrak (1990, 1993) concern unfortunately his own records only. Moreover, it is to be taken in account that in addition to the records yet published, there is a large number of unpublished occasional records including the museum specimens collected by various visitors in frame of the trips focused to other than bat topics.

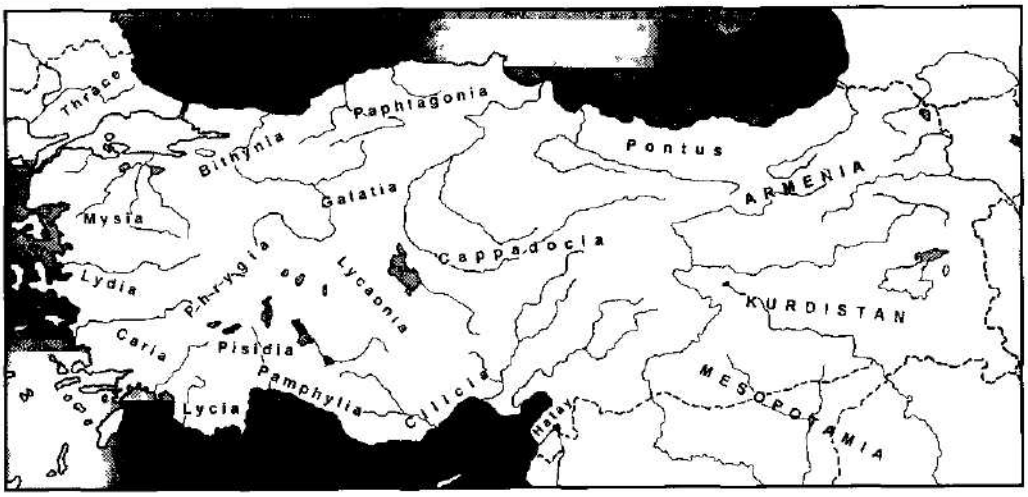

Fig. 2. A general map of Turkey, main historical regions as understood in this paper.

The present paper is intended to survey all the available records both published and unpublished including the records dispersed in various collections, kindly provided by their curators, and, in particular, the not yet surveyed records obtained during our own research trips in Turkey undertaken, in the years 1990–1998. Most of them were undertaken in frame of the project "Evolutionary relations between mammals of Central Europe and those of the Mediterranean" (GAČR 206/93/0531) in a joint cooperation with Slovene Natural History Museum Ljubljana and Department of Biology, Thracian University Edirne.

Localities were named with respect to allow an easy later confirmation according to a map atlas Turkei, Euro-Reiseatlas 1 800 000 Berlin-Gutersloh-München-Stuttgart RV Reise- und Verkehrsverlag GmbH, 96 pp , 1991

The list of records (arranged in alphabetical, and chronological order respectively) include for each item the following information the name of the district (villayet) (in spaced types), the name of the locality [in brackets number of the locality from the map, in *italics* those not indicated in a map], and/or description of record site, date, number of recorded animals with a sex indication (m – male, f – female, s i – sex indefined), age (j – juvenile, s [sa] subadult, a [ad] – adult) and physiological condition (G – pregnancy, L – lactation), and, in some instances, a collection of museum material deposition (CUP = Department of Zoology, Charles University, Prague, Czech Republic, NMP = National Museum, Prague, Czech Republic, NMW = Natural History Museum, Vienna, Austria, PMSL = Slovene Natural History Museum, Ljubljana, Slovenia, SMF = Senckenberg Museum Frankfurt a M , Germany, SNMB = Slovak National Museum, Bratislava, Slovakia, TUE = Thracian University Edirne, Turkey, ZIN = Zoological Institute of Russian Academy of Sciences, St Petersburg, Russia)

The data adopted from literature and/or museum collections include a reference to an original author For the technical reasons, some of the letters used in Turkish alphabet were printed without the specific accents, thus, in the following text, g is uses instead of ğ, as well as i instead ı

For purpose of biogeographic comparisons in frame of the present paper, the territory of Turkey was subdivided into six main units (Fig 3, Tab 1) delimited with respect to the phytocoenological subdivision of the Middle East by Zohary (1973) (1) Northern forests Region of euxinian and sub-euxinian mesic deciduous and mixed forest (1a Thrace, 1b Western Pontus, 1c Eastern Pontus), (2) Mediterranean woodland Region of Mediterranean woodland climax, incl subalpine forests of *Cedretea libani* (2a Aegean coast, incl Dardanelles, Lydia and Caria, 2b Western

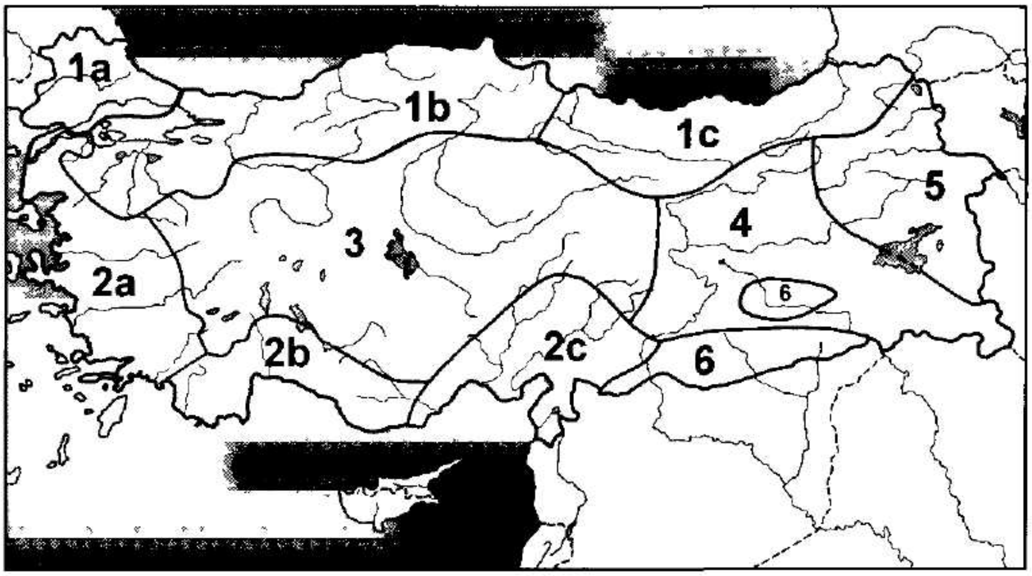

Fig 3 Map of Turkey with subdivision into the major biogeographic regions, in sense of Zohary (1973), see text

Levantine coast incl Lycia and Pamphylia, 2c Eastern Levantine coast, incl Southern Antitaurus Mts , Cilicia and Hatay), (3) Central Anatolian steppes Region of xero-euxinian steppe-forest, incl Central Anatolian dwarf-shrub steppes, (4) Kurdistan Region of Kurdo-Zagrosian xerophilous deciduous steppe forest, (5) Armenian Highlands Region of mosaics of Anatolian *Artemisietea fragrantis armeniaca* and sub-euxinian oak forests, (6) Upper Mesopotamia Region of Mesopotamian steppes incl Mediterranean steppe-maquis

LIST OF SPECIES

Rousettus aegyptiacus (Geoffroy, 1810)

RECORDS **Original data** İçel Narlıkuyu [1] 29 Oct 1993 remains of 1 ind in a pellet of cf *Strix aluco*, – Silifke [2], Castle of Silifke, 30 July 1996 obs 1 ind (leg Storchova) – Hatay Çevlik [3], 3 July 1998 right mandible in a fresh pellet of *Strix aluco* (leg Obuch) – **Literary data** Adana Adana [4], Milli Mensucat Fabrikası factory, 1 ind (Albayrak 1993) – Antalya gardens near Alanya [5], 15 Aug 1975 1 ind (Kinzelbach 1986), – Finike [6], Cliff cave, remains of 3 ind in subfossil deposite (Corbet & Morris 1967) – Hatay Antakya [7], April 1955 2 ind ad , 4 ind sa (Eisentraut 1959, Lehmann 1966), – Bedirge (= Serinyol) [8], 1964–65 (Kumerloeve 1975), – Harbiye [9], 12 Sept 1971 2m (Spitzenberger 1979), – Harbiye magarası cave [9], colony ca 200 ind , coll 32 ind (Albayrak 1990), Harbiye village [9], (Dermacta koyu) cave, 16 Febr 1960 2f (Kahmann & Çaglar 1960, Çaglar 1965, 1968), – Iskenderun [10], gardens in the town (Kumerloeve 1975), – Narlıca magarası cave [11] (Şadoglu 1953), – southern part of the dist , S of the Amanus Mts (= Nur Dagları) (Kumerloeve 1975), – vicinity of Antakya [9], 1953 59 ind (mummies) (Lehmann 1966) – İçel near Gulnar [12], 27 March 1986 1 ind (Kinzelbach 1986) Tarsus [13], Say koyu village, Delikli magarası cave, 2 ind (Albayrak 1993), – *Taşucu [14], 23 April 1992 "etwa ein Dutzend" (Bulow 1997)*

DISTRIBUTIONAL STATUS (Fig 4) In the territory of Turkey, *R aegyptiacus* reaches the northern margins of its World distribution range The records come from the South-Anatolian coast and from Hatay The Turkish population (similarly like that in Cyprus) is to be looked upon as quite isolated as the distribution range is, based on the present knowledge, apparently discontinuous over the East-Mediterranean region Namely, this species has not been reported either from the Syrian part of Orontes valley neighbouring the Turkish range, and, surprisingly, from Syria at all (Harrison &

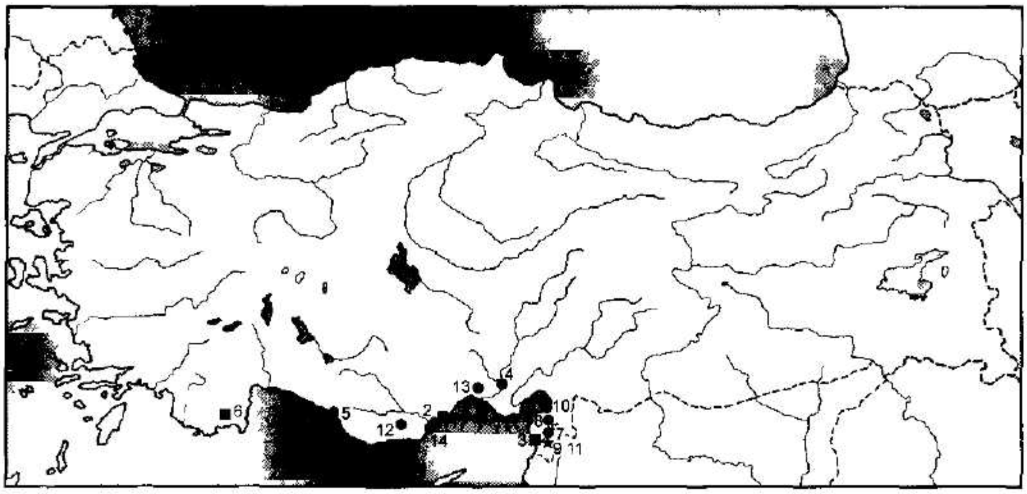

Fig 4 Records of *Rousettus aegyptiacus* in Turkey Squares denote the osteological findings, asterisks the records of nursery colonies and circles the all other records

Bates 1991) This fact is especially noteworthy because this species is known common in Jordan and Israel, where (e g in the Jordan River valley) it was even considered a serious agricultural pest The discontinuity of distributional data in the Levant may results of a lack of field data, of course, and of generally poor knowledge on bat fauna of Syria (cf Benda 1996) Nevertheless, against expectancy this species was not recorded even during our recent expeditions in Syria. The biogeographic interpretation of the population of *Rousettus aegyptiacus* from the Northern Levant remains, hence, an open question

TAXONOMIC STATUS Eisentraut (1959) who analyzed the material from all sides of the distribution range (including specimens from Turkey) arranged the Turkish sample under the nominotypic subspecies *R aegyptiacus aegyptiacus* (Geoffroy, 1810) (terra typica. Giza, Egypt) In general, the western part of the species range, north of Sahara, is colonized by two forms which may be looked upon as separate subspecies (Harrison & Bates 1991, Hayman & Hill 1971, Nader 1975), viz *R a aegyptiacus* (Turkey, the Levant, Cyprus, and Egypt to the Middle Arabia) and *R a arabicus* Anderson et de Winton, 1902 (t t . Aden, Yemen) (Southern Arabia to Pakistan)

Rhinolophus ferrumequinum (Schreber, 1774)

RECORDS **Original data** Burdur Bucak [1], Susuz Han, small cave near ruins, 25 March 1992 1f (leg Zukal) – Erzurum Koprubaşı [2], a small cave below a castle, 9 Sept 1995 obs 1 ind – Hatay Çevlik [3], ancient tombs, 20 May 1995 net 1m, 9fa, NMP (spec Nos 47928–47932, 48089–48093, cf Benda 1996), 29 Sept 1995 2f (leg Mlikovsky), 1 July 1997 2 mummies – Içel Bozagaç Yalan Dunya magarası cave [4], 30 Oct 1993 net 4m, CUP Kırklareli Igneada [5], Longoz, Bezergan magarası cave, 9 May 1992 obs 4 ind (leg Reiter Andreas & Sadlova), 22 June 1994 net 1m, 4f, CUP, – Sarpdere, Dupnisa magarası cave [6], 16 Oct 1993 net 1f, CUP, Summer 1995, PMSL (leg Kryštufek), – Sarpdere, Kız magarası cave [7] 17 Oct 1993 obs 1 ind – Kocaeli Hereke [8], cave, 25 June 1969 nurs colony, coll 2m, 3f, SNMB (leg Matoušek, cf Benda 1996) – Konya Tınaztepe magarası caves [9], 8 May 1997 coll 2ms (leg Wolf) – Mugla Kaya (n Fethiye) [10], 22 April 1992 coll 1m, CUP (leg Hanak) – Sakarya Hanyatak [11], a small cave, 27 June 1994 net 1 ind, CUP – Samsun Kurtler [12], solitary house on the coast, 23 Oct 1993 coll 1f, CUP – Tunceli blind train tunnel in the Euphratus river valley n Derebuk village [13], 27 Oct 1993 coll 1m, CUP, 14 Sept 1995 net 1m 10f, 1 s i, CUP – Zonguldak Çayır [14], Çayırkoy magarası cave, 20 Oct 1993 obs 1 ind, – Safranbolu [15], Mencilar (= Mencilis) magarası cave, 2 Nov 1994 55 ind (semitorpid), – Yenice [16], a large cave n railway, 1 July 1994 obs a colony 80 ind, 2 July 1994 net 1f, CUP – **Literary data** Adana Haruniye [17], 6 ind (Lehmann 1966), – Karaisalı [18], Kapıkaya koyu village, Eski cami mosque, 3 ind (Albayrak 1993) – Adıyaman Karadut [19], cave, 7 June 1992 7 ind (from owl's pellets) (Obuch 1994), – Kuyucak bucagı [20], 1 ind (Albayrak 1990), – Pınaryayla koyu village [21], 2 ind (Albayrak 1990), – Zey koyu village [22], 15 ind (Albayrak 1990) – Afyon Bolvadın [23], Dişli, Kışlak mevkii, 1 ind (Albayrak 1993), – Çaykışla koyu village [24], cave, 4 March 1963 2m (Çaglar 1965, 1968) – Ankara Gerdu (n Emir Golu) [25], 19 August 1953 1m (DeBlase & Martin 1973) – Antalya Beşkonak [26], 30 June 1986 1faL (Helversen 1989b), – Çatallar [27], cave, sum 1965 3 ind (Corbet & Morris 1967), – Finike [28], Clift cave, sum 1965 skeleton of 1 ind (Corbet & Morris 1967), – Kaş [29], Limanagzı, Hıdırellez magarası cave, 4 ind (Albayrak 1993), – Perge [30], 9 Oct 1984 7 ind (Helversen 1989b), – Yalnız [31], rock shelter, summer 1965 1 ind (Corbet & Morris 1967) – Balıkesir Erdek [32], cave, 7 Oct 1967 1 mummy (Steiner & Gaisler 1994), – Havran [33], 17 March 1969 1m (Felten et al 1977), Havran, cave, 11 April 1965 7m (Çaglar 1965, 1968) Havran Inonu koyu magarası cave, 1 ind (Albayrak 1993), – Ilıça Çiftl [34], 24 Sept 1960 1m, 1f (Felten et al 1977) – Bolu 10 km N of Bolu [35], 16 Sept 1965 1m, 1f (Felten et al 1977), – Duzce [36], Aydınpınar koyu village, 1 ind (Albayrak 1993), – Sarıkaya (n Gerede) [37], cave, 23 Febr 1964 16m, 6f (Çaglar 1965, 1968), – Seben [38], Celtikhdere koyu, Kılınçdere mevkii, 1 ind (Albayrak 1993) – Bursa Inkaya [39], Kuşini cave, 18 March 1969 1m, 5f (Kock 1974, Felten et al 1977) – Çanakkale 4 km S of Yalova [40], 30 May 1967 (Hůrka 1972, Peus 1978a), 7 May 1968 (Peus 1978a), – Eceabat [41], Kilitbahir Tabyaları, 3 ind (Albayarak 1993) – Çankırı Eskipazar [42], 24 Sept 1965 2m, 1f (Kock 1974, Peus 1976, Felten et al 1977), – Yukarı Kayayanları koyu village [43], 4 ind (Albayrak 1993) – Denizli Çukur koyu [44], Çamlık mezarı, 1 ind (Albayrak 1993) – Diyarbakır Ergani [45], Sesverenpınar koyu village, Han magarası caves, 1 ind (Albayrak 1990), – Surlar [46], Kardeşler Burcu, 8 ind (Albayrak 1990) – Edirne Greek-Turkish border, August 1971 (Kumerloeve 1975) – Elazıg Harput [47], Anguzunoba mevkii, Sarıkayalıklar, 3 ind (Albayrak 1990) – Erzincan Çaglayan [48], Girlevik koyu village, 4 ind (Al-

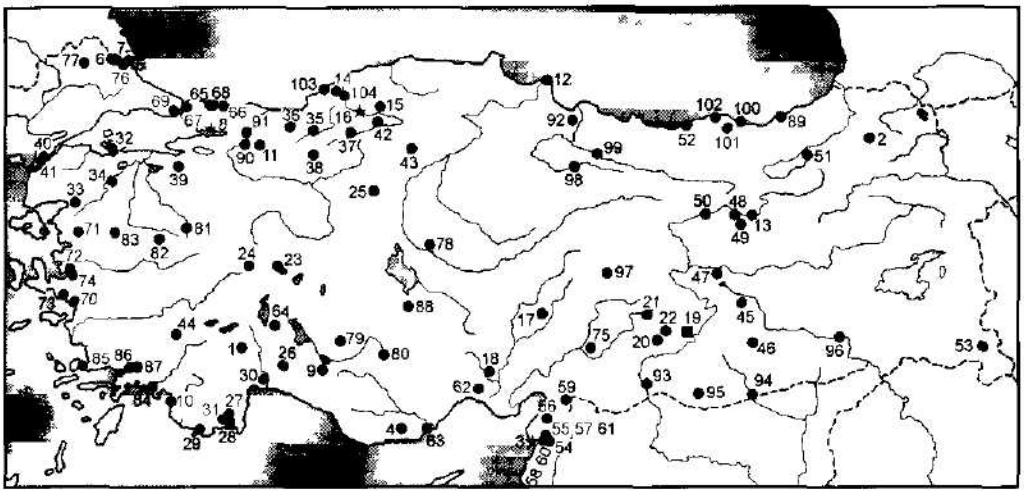

Fig 5 Records of *Rhinolophus ferrumequinum* in Turkey For symbol explanations see Fig 4

bayrak 1990), – Kalecık koyu village [49] 2 ind (Albayrak 1990), – Castle of Kemah [50], 3 ind (Albayrak 1990) – *Erzurum Çamlımagara cave [51], 10 Sept 1967 1m (Steiner & Gaisler 1994)* – Giresun Espiye [52], cave, 2 August 1983 2m (Helversen 1989b) – Hakkâri Dezkoy [53], 5 ind (Albayrak 1990) – Hatay Altınozu [54], Kozkalesi koyu village, 13 ind (Albayrak 1990), Antakya [55] (Theodor 1967), – Belen [56], Şenbuk Castle of Bakras, 2 ind (Albayrak 1990), – Habibnecar dagı (n Antakya) [57], aquaeductus, 18–22 Febr 1960 28m, 3f (Kahmann & Çaglar 1960, Çaglar 1965, 1968, Kock 1974), – Harbiye magarası cave [58], 1 ind (Albayrak 1990), – Harbiye [58], 3 ind (Felten et al 1977), Hassa [59], Akbez bucagı, 4 ind (Albayrak 1990), – Narlıca magarası cave [60] (Şadoglu 1953), Senpiyer [61], vicinity of Kılisesi, 1 ind (Albayrak 1990) – Içel Tarsus [62], Yanıkkısla Koy village, 19 March 1953 1 ind (Lehmann 1966) = Yenikısla koyu village (Çaglar 1968), – Taşucu (n Silifke) [63], cave, 11 Febr 1961 1m (Çaglar 1965, 1968) – Isparta Anamas [64], 18 Febr 1969 1m, 1f (Felten et al 1977) – Istanbul 10 km W of Şile [65], Satzmal magarası cave 29 April 1955 1m, 1f (Strinati 1959), Hacıllı (W of Agva) [66], Yassıkaya caves 30 April 1955 6m, 3f (Strinati 1959), – Saklı koyu village (n Beykoz) [67], cave, 30 May 1959 1f (Çaglar 1965 1968), – Şile [68], cave, 19 March 1964 8m, 8f (Çaglar 1965 1968), – Tower of Fort Rummel Hisar [69], 1 Sept 1953 1f (DeBlase & Martin 1973), – vicinity of Istanbul (Kumerloeve 1975) – Izmir Ahmetbeyli [70], 15 April 1966 1 ind (Kock 1974), 16 Febr 1969 1m (Felten et al 1977), – Bergama [71], 2 April 1969 1f (Felten et al 1977), 8 June 1977 4 ind (Kock 1989), Bergama, Akropolis ruins, 17 Sept 1960 3m, 9f (Çaglar 1965, 1968), – Bornova [72], 20 Febr 1969 1m (Felten et al 1977), – Gumuldur [73], 15 April 1969 1f (Felten et al 1977), Incirli pit 2 ind (Albayrak 1993), – Smirne (= Izmir) [74], 1870 "numerosi esemplari" (Doria 1887) – Kahraman Maraş Sarıkaya koyu village [75], 13 ind (Albayrak 1990) – Kırklareli Demirkoy, Sarıdere (= Sarpdere) koyu village, Kız magarası cave [7], 1 ind (Albayrak 1993), – Demirkoy, Sivriler koyu village [76], Arnavutdere, 1 ind (Albayrak 1993), – Kayalı deresi [77], 28 ind (Albayrak 1993) Kırşehir D Inlimurat magaraları caves [78] 1 ind (Albayrak 1993) – Konya Guneydere (Botsa) koyu ini [79] 2 ind (Albayrak 1993), Kara Dag Mts [80] (Osborn 1963) – *Kutahya Sabuncupinar [81], Yenice çiftligi, 1 ind (Albayrak 1993)* – *Manisa Demirci [82], Çataoluk koyu* village, Delikyar magarası cave, 10 ind (Albayrak 1993), Yuksek Çobanisa [83], 15 March 1969 2m, 1f (Felten et al 1977) – Mugla Dalyan [84], Kaunos harabeleri ruins, 1 ind (Albayrak 1993, Baran et al 1994), – Farilya koyu village (n Bodrum) [85], cave, 27 April 1964 2m (Çaglar 1965, 1968), – Gokova Korfezi [86], castle of Akyaka koyu village, 1 ind (Albayrak 1993), – Kaya koyu village [10], 26 March 1969 1m (Felten et al 1977), – Kerme korfezi [87], Akyaka koyu village, 14 ind (Albayrak 1993) – Nigde (= Aksaray) Sultanhanı [88], 28 August 1975 1ma, 1ms, 9fa, 2fs (Nader & Kock 1983) – Rize Rize [89], mosque, 16 June 1960 1m (Çaglar 1965, 1968) Sakarya Geyve [90], Ark koyu village, Vaysallar mahallesi, 3 ind (Albayrak 1993) – Karaçam koyu village [91], ruins of building, 31 March 1963 2m, 1f (Çaglar 1965, 1968) – Samsun Asragaç koyu village [92], Kelkaya mahallesi, 3 ind (Albayrak 1990) – Şanlı Urfa Castle of Birecik [93], 7 ind

(Albayrak 1990); – Ceylanpinar [94], 18 May 1968: 1f (Lehmann 1969), – Harran [95], Şuayipşar koyü village, 2 ind (Albayrak 1990) – Sıırt: Gokçebag köyu village [96], 3 ind (Albayrak 1990) – Sıvas Gurun [97], Şugul mahallesı, 1 ind (Albayrak 1990) – Tokat: Geraz mahallesı [98], 1 ind. (Albayrak 1990), – Nıksar [99], castle, 25 Febr 1960 1m, 2f (Çaglar 1965, 1968). – Trabzon: Trabzon (no exact loc.) [100] (Çaglar 1965, 1968), – Scalıta [101] (Osborn 1963); - Vakfikebir [102], cave, 21 April 1969 1m (Steiner & Gaisler 1994) – Zonguldak Fılyos [103], cave, 13 Sept. 1964. 1m, 1f (Çaglar 1965, 1968), – Saz koyu village [104], ruins of a building, 9 Sept 1964: 3f (Çaglar 1965, 1968).

DISTRIBUTIONAL STATUS (Fig. 5). This species occurs in all regions of Turkey and belongs here among the most common bat species (Tab. 1). Similarly as in the northern part of its distribution range (Horáček 1984) even in Turkey this species tend to occupy synanthropic habitats (cf. the record No. 12) in addition to caves which yielded a great majority of its records. Hibernating colonies in caves are formed at least from the beginning of November to the end of March. As in other species, continuous data on course of hibernation in Turkey still absent, of course.

TAXONOMIC STATUS. Turkish population of this species was first taxonomically evaluated by Kumerloeve (1975) who expected a nominotypic subspecies *R. ferrumequinum ferrumequinum* (Schreber, 1774) (terra typica: France) in Thrace while for the Eastern Anatolia he expected the form *R. f. irani* Cheesman, 1921 (t. t.: Shiraz, Iran). This decision followed a concept proposed by Aellen (1959) but, unfortunatelly, no one of these authors keyed the forms by metrical and/or morpholo-gical characters except for an index LCd/LAt. Felten et al. (1977) suggested that whole the territory of Turkey (including the Eastern Anatolia) as well as the Levant is colonized by a nominotypic form while this does not concern of Afghanistan and Iran that, according to the Aellen's (1959) character, belong to *R. f. irani*. Felten et al. (1977) pointed out also a specific situation with the samples from (FYR) Macedonia, the Northern Greece and Sicily for which they proposed the name *R. f. martinoi* Petrov, 1941 (t. t.: Trifunovićevo, Macedonia) and discussed a possible synonymy of *R. f. irani* and *R. f. proximus* Andersen, 1905 (t. t.: Gilgit, Kashmir). The latter question has also been discussed by Strelkov et al. (1978) who show that the characters discriminating both the forms as suggested by previous authors largely are not valid for the Turkmen specimens which moreover are generally smaller than those from Iran and Afghanistan. DeBlase (1980) reports *R. f. irani* also from the Eastern Turkey and Nader & Kock (1983) from Iraq including the higher altitudes of that country. Koopman (1994) considers the form *R. f. irani* a younger synonym of *R. f. proximus* which range he states as "Southwestern Asia east to Kashmir".

Variation in the Southeastern Europe was investigated in details by Kryštufek (1993) who described here a cline trend in metrical characters for which he doubts separate status of *R. f. martinoi* that is thus considered to be synonymous with the nominotypic subspecies. The cline variation in size within whole the Western Palearctic range has also been demonstrated by DePaz (1995) who discusses it from the ecological point of view without suggesting any taxonomical inferrences. Analyzing the sample from the Northeastern Turkey with aid of the Aellen's index, Steiner & Gaisler (1994) found it to belong to *R. f. ferrumequinum*. The same conclusions can be preliminary drawn also based on our own material most of which come just from the Northeastern Turkey (LCd/LAt 0.63–0.84, $\bar{x}$=0.703, n=12).

In conclusions, the data mentioned above indicate that there may be a slight cline increase in size from the west to the east over territory of Turkey but to which degree it is combined with shifts in other characters and/or with variation of a categorial type, it remains a task of further study.

Rhinolophus hipposideros (Bechstein, 1800)

RECORDS **Original data** Burdur: Taşkapı [1], Insuyu magarası cave, 24 March 1992 net 2m, 1f (leg Zukal). – Çanakkale. Gokçeada Island [2], 1994. 4 ind., TUE (leg Özkan) – Erzurum: 10 km SW of Aydogu [3], canyon, 9 Sept 1995. det. min 1 ind. – Hatay: Çevlık [4], ancient tombs, 1 July 1997 obs 1 ind sa, – Konacık

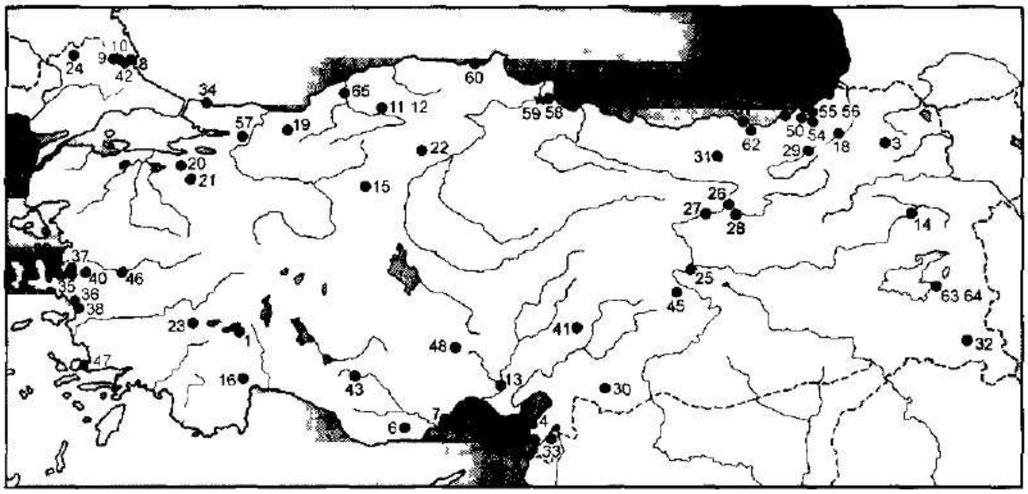

Fig 6 Records of *Rhinolophus hipposideros* in Turkey For symbol explanations see Fig 4

[5], 24 Oct 1991 net 1m, NMP (spec No 51476, leg Červeny) – Içel Bozagaç [6], **Yalan Dunya magarası** cave, 30 Oct 1993 net 2m, 2f, CUP, – Narlıkuyu [7], small cave 29 Oct 1993 net 1f, CUP – Kırklareli Igneada, Longoz, Mermer magarası cave [8], 9 May 1992 obs 1 ind (leg Reiter, Andreas & Sadlová), – Sarpdere, Dupnisa magarası cave [9] 16 Oct 1993 obs 1 ind, – Sarpdere, Kız magarası cave [10], 17 Oct 1993 obs 1 ind, 22 June 1994 obs 2 ind Zonguldak Safranbolu, a small house in Mencılar (= Mencılıs) magarası cave [11], 4 July 1994 coll 1m, CUP, – Safranbolu, Mencılar (= Mencılıs) magarası cave [12], 2 Nov 1994 obs 4 ind (semitorpid) **Literary data** Adana "Adana-Gebiet" [13], 1 ind sa (mummy) (Lehmann 1966) Agri Hamur [14], 1 ind (Albayrak 1990) – Ankara Yenikent [15], 3 ind (Albayrak 1993) – Antalya abandoned building in Termessos [16], 30 Sept 1984 1 ind (Helversen 1989b) – Artvin Hopa [17], Sarp koyu camii mosque, 1 ind (Albayrak 1990), – Yusufeli [18], Kılıçkaya bucagı, 26 ind (Albayrak 1990) Bolu Duzce [19], Aydınpınar koyu village, 1 ind (Albayrak 1993) – **Bursa** Bursa [20], building, 19 June 1961 1f (Çaglar 1965, 1968), – Uludag [21], Karazlıyayla, ruins of building, 12 Sept 1960 1f (Çaglar 1961a, 1965, 1968) – **Çanakkale** *Gokceada [2], monastery in Baraj*, 20 *ind* (Albayrak 1993) – **Çankırı** *Çankırı (no exact loc)* [22] (Çaglar 1965, 1968) – Denizli Derekoy [23], 23 Febr 1969 1m (Felten et al 1977) – Edirne Lalapaşa [24], Sinankoyu magaraları caves, 1 ind (Albayrak 1993) Elazig Keban [25], Nimri magaraları caves 3 ind (Albayrak 1990) – Erzincan Erzincan [26], building of Pest Control Research Institute 3 ind (*Albayrak 1990*), – *Kemah [27], Dizdar Çay creek mill 3* ind (*Albayrak 1990*), – *Terzibaba cemetery [28]*, tanner factory, 8 ind (Albayrak 1990) – Erzurum Çoruh Nehri (W of Ispir) [29], 3 August 1987 1 ind (Helversen 1989b) – Gaziantep Mezarlık magaraları caves [30], 1 ind (Albayrak 1990) – Gumuşhane Baglarbaşı mahallesi [31], 1 ind (Albayrak 1990) – Hakkâri Nestoranian church [32], 16 km ENE Hakkâri, 16 Aug 1973 4f (Spitzenberger 1979) – Hatay Altinozu [33], Kozkalesi koyu village, 4 ind (Albayrak 1990) – Istanbul 10 km W of Sile [34], Satzmal magarası cave, 29 April 1955 4f (Strinati 1959) Izmir Smirne (= Izmir) [35], 1870 1 ind (Doria 1887), Izmir (no exact loc) (Çaglar 1965, 1968), – Ahmetbeyli [36], 16 Febr 1969 1m (Felten et al 1977), – Bornova [37], 20 Febr 1969 and 6 April 1969 4m (Felten et al 1977), Ephesus (= Efes) [38], 12 Aug 1976 1m, 1f (Spitzenberger 1979), – Foça [39], 26 April 1985 1f (Helversen 1989b), – Kemalpaşa [40], cave, 10 Jan 1960 1m, 22 May 1961 1f (Çaglar 1961a, 1965, 1968) – Kahraman Maraş Dongel magaraları caves [41], 1 ind (Albayrak 1990) – Kırklareli Demirkoy, Saridere (= Sarpdere) koyu village, Kız magarası cave [10], 9 ind (Albayrak 1993), – Şeytanderesi [42], Kazankaya, 1 ind (Albayrak 1993) – Konya Goksu Nehri (E of Hadım) [43], 24–27 June 1986 3 ind (Helversen 1989b), Ieme Pınarı cave (SE of Arak) [*44*], 1 March 1969 1m (Felten et al 1977) – Malatya Eski Malatya [45], Kervansaray, 1 ind (Albayrak 1990) – Manisa Salihli yolu [46], 1 ind (Albayrak 1993) Mugla Bodrum [47], Farlıya koyu village, cave, 27 April 1964 1m (Çaglar 1965, 1968) – Nigde Madenkoy [48], 1 Aug 1970 1m (Spitzenberger 1979), – Rize Lamgo koyu village [*49*], mosque, 18 June 1960 3f (Çaglar 1961a, 1965, 1968), 8 ind (Albayrak

1990), – Ortakoy (Hemişin) bucagi [50], Akyamaç köyü village, 26 ind (Albayrak 1990), – Pazar [51], Sivrikale koyu village, 8 ind. (Albayrak 1990), – Rize [52], tank, 14 June 1960 7m, 28f (Çaglar 1961a, 1965, 1968); – Sarnic [*53*], 6 ind (Felten et al 1977), – Şenyuva (n Çamlıhemsin) [54], house, 24 August 1967 3f, 8 Sept 1968: 1m (Steiner & Gaisler 1994), – Sivrikale koyü village [51], mosque, 15 June 1960. 4f (Çaglar 1961a, 1965, 1968); – Soga (n Pazar) [55], house, 6 Sept 1968. 3m, 3f (Steiner & Gaisler 1994), – Tezine (n Pazar) [56], house, 5 Sept 1968: 1f (Steiner & Gaisler 1994) – Sakarya. Sapanca [57], Istanbuldere (Erdemli) koyu village, 11 ind (Albayrak 1993) - Samsun. Duvecik koyu village [58], 3 ind (Albayrak 1990), – Tozkoy (20 km S of Bafra) [59], 30-31 July 1983 obs 2 nursery colonies (Helversen 1989b) – Sinop Ayancik [60], Inalti koyu village, Dorthavuz Camii mosque, 25 ind (Albayrak 1993) – Trabzon Trabzon (no exact loc.) [61] (Çaglar 1965, 1968), – Kutlugün koyu village [62], 9 ind (Albayrak 1990) – Van Van (no exact loc) [63] (Andersen 1905, Çaglar 1965, 1968), – Castle of Van [64], 10 ind (Albayrak 1990) – Zonguldak Çaycuma [65], Sazkoyu, 11 ind (Albayrak 1993), – Saz koyü village [65], ruins of building, 9 Sept 1964. 2f (Çaglar 1965, 1968)

DISTRIBUTIONAL STATUS (Fig. 6). This species belongs among those which records in Turkey are quite a frequent. Although found in all biogeographic regions (except for the Upper Mesopotamia), it seems rare in the Central Anatolian platteau (Tab. 1).

TAXONOMIC STATUS. Aellen (1959) suggests that the region of the Eastern Caucasus Mts. and the Northwestern Iran (and hence also the Eastern Turkey) is colonized by the nominotypic subspecies inhabiting also most of the European range, i. e. *R. hipposideros hipposideros* (Bechstein, 1800) (terra typica: France), while the Eastern part of the range, Turkmenistan and Afghanistan is colonized with a different form, *R. h midas* Anderesen, 1905 (t. t.: Jask, Persian Gulf). Lehmann (1966), without quoting details, reports from Adana (Southern Turkey) *R. h. minimus* Heuglin, 1861 (t. t.: Keren, Eritrea). Saint-Girons & Caubere (1966) demonstrated a cline increase in size over Europe, from the west to the east onwards, while the populations from the Southeastern Europe and the Mediterranean they consider a separate subspecies, *R. h minimus*. Correspondingly, Hayman & Hill (1971) consider that the Mediterranean populations (and populations of the Eastern Africa from Ethiopia to Egypt) differ from those of the continental Europe, and except for Morocco inhabited by a subspecies *R. h escalare* Andersen, 1918 (t. t.: Mogador, Morocco), they arranged them all under the form *R. h. minimus*. The topic was reanalyzed in details by Felten et al. (1977) who subdivided the Mediterranean material in four groups based on morphology of infraorbital region, position of minute preamolars and size. The geographic ranges of these groups coidentified with the above mentioned subspecies were as follows: *R. h. hipposideros* continental Europe from Portugal to Greece and Israel, *R. h minimus* Ethiopia (= Eritrea, i. e. terra typica) and Crete, *R. h. midas* the Northeastern Anatolia, Afghanistan, *R. h. escalare* the Northwestern Africa, Malta, Sicily, Pantelleria and the Western Anatolia (in the last area perhaps an undescribed form, eventually). Though such a result may look obscure from the zoogeographic point of view, it undoubtedly demonstrates that just in Turkey the situation with the species in question is indeed a very complicated.

Corbet (1978) simplifies the view by accepting two subspecies only, viz. *R h midas* (from Iraq to Kashmir) and *R. h. hipposideros* (remaing part of the Palearctic range, including Turkey). DeBlase (1980) synonymizing his *R. h. billanyani* DeBlase, 1975 (t. t.: Fars, Iran) with *R h. midas*, extends the range of *R. h. midas* to the Eastern Turkey although he tentatively considers there also *R. h hipposideros*. Qumsiyeh (1985) reports for Sinai *R. h. minimus* similarly as do Harrison & Bates (1991) for whole the Western Arabia (except for Syria), and in contrast to Iraq for which they report *R. h. midas*. Koopman (1994) recognizes 7 subspecies, judging of his brief characteristics of ranges, he may expected *R. h. minimus* for Turkey. Steiner & Gaisler (1994) identified (based on criteria by Felten et al. 1977) their sample from the province of Rize as *R. h. midas* and tentatively excluded all remaining three subspecies mentioned by Felten et al. (1977), including *R h hipposideros*.

Already the above mentioned survey illustrates well how complicated the systematics of *Rhinolophus hipposideros* in Turkey actually may be. In cannot be excluded that just here we meet at

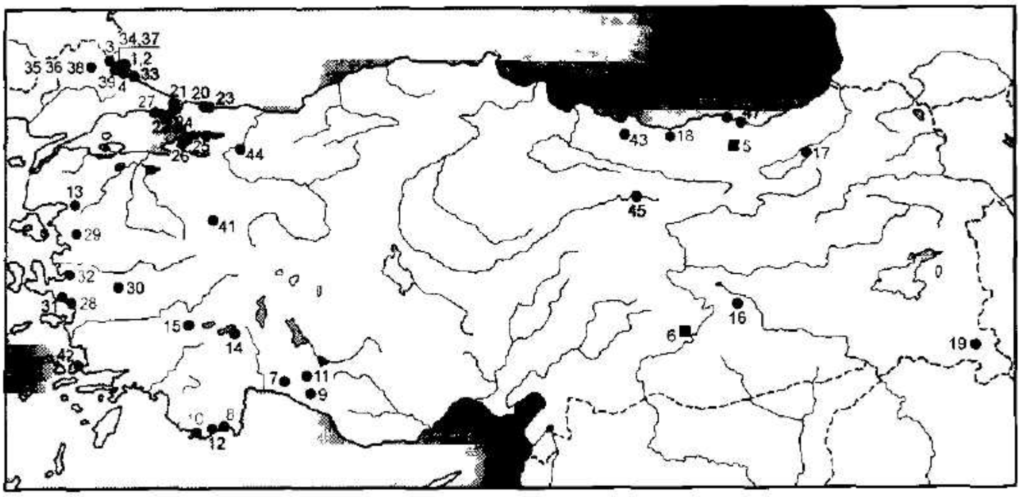

Fig 7 Records of *Rhinolophus euryale* in Turkey For symbol explanations see Fig 4

least one or two zones of step-like shifts in phenotypic variation, i. e. the boundaries delimiting taxonomically separated populations that can be recognized as subspecies, eventually. In these connections, the results of karyological studies are particularly worth of mentioning (Zima et al. 1992, Horáček & Zima 1996). While 2n=56 karyotype was found in Europe, the Caucasus Mts. and in the Balkans (Greece and Bulgaria), in Jordan (Qumsiyeh et al 1986), Asia Minor (the records Nos 7 and 11, cf. Horáček & Zima 1996), in the Central Iran and Syria (own unpublished results) 2n=58, and in Kirghizia 2n=62 (Zima et al. 1991; the Kirghiz form probably represents a separate species, cf. Horáček & Zima 1996). The taxonomic meaning of these differences as well as their correspondence with variation pattern in other characters are just one of the topics that are to be carefuly reexamined to achieve a real comprehension to systematics of *R. hipposideros* in Turkey.

Rhinolophus euryale Blasius, 1853

Records **Original data** Kirklareli Igneada, Longoz, Bezergan magarası cave [1], 22 June 1994 net 3m, 2f, CUP, – Igneada, Longoz, Mermer magarası cave [2], 9 May 1992 obs several hundred ind (leg Reiter, Andreas & Sadlova); Sarpdere, Dupnısa magarası cave [3], 16 Oct. 1993 net 1m, CUP, – small cave in a quarry n Safe suyu spring (3 km NW Sergen) [4], 1 Sept 1996 net 3ms, 1ma, 1fs, coll 1ms, 1fs, NMP (spec Nos 47951, 47953) – Trabzon Maçka [5], a cave 6 km SW, 26 Oct 1993 traces of a colony, 1 part skeleton, CUP. – **Literary data** Adiyaman Karadut [6], cave, 7 June 1992 2 ind (from owl's pellets) (Obuch 1994) – Antalya Aspendos [7], vault of amphitheatre, 7 Oct 1984 1 ind (Helversen 1989b), – W of Finike [8], 2 ind (DeBlase 1972), Finike, Cliff cave, sum 1965 5 ind (Corbet & Morris 1967), – Incekum [9], 22 May 1966 1f (Felten et al 1977), – Kaş [10], Limanagzı, Hıdırellez magarası cave, 1 ind (Albayrak 1993), – Manavgat [11], ancient aquaeduct, 30 June 1986 1f (Helversen 1989b), – Myra [12], tombs, 4 Oct 1984 1 ind (Helversen 1989b) – Balıkesir Havran [13], Inonu köyu magarası cave, 2 ind (Albayrak 1993) Burdur Insuyu *magarası cave* [14], 4 *ind* (Albayrak 1993) – *Denizli*: Derekoy (n Kaklık) [15], 23 Febr 1969 1f (Felten et al 1977) – Diyarbakır Çayırdere (n Ergani) [16], 24 Oct 1968· 2f (DeBlase & Martin 1973). – Erzurum Çamlımagara [17], cave, 10 Sept 1967 1 mummy (Steiner & Gaisler 1994) – Giresun Kayadıbı mahallesi [18], Dagdıbı magarası cave, 2 ind (Albayrak 1990). – Hakkâri Dezkoy [19], 10 ind (Albayrak 1990) – Istanbul 10 km W of Sile [20], Satzmal magarası cave, 29 April 1955 8 ind. (Strinati 1959), – Belgrat Orman [21], 23 May and 25 June 1968 (Hůrka 1972), – Küçukçekmece [22], *Halkalı*, cave, *15 May 1971*, 3m, 1f (*DeBlase*

& Martin 1973, Peterson et al 1976); – Sile [23], cave, 10 Sept. 1963· 6m, 5f, 12 July 1965 9mj, 2fa, 4faL, 5fj (Çaglar 1965, 1968); – Istanbul [24], 1 ind (DeBlase 1972), – Yalova [25], Sogucak köyu magaraları caves, 1 ind (Albayrak 1993), – Yalova Termal [26], 1 ind (Albayrak 1993), - Yarımburgaz [27], cave, 19 May 1960, 1f (Çaglar 1965, 1968) – Izmir Ahmetbeylı [28], 15 April 1969 1f (Felten et al 1977), – Bergama [29], 2 April 1969. 1m, 2f (Kock 1974, Felten et al 1977), 8 June 1977: 8 ind (Kock 1989), Bergama, Akropolis, ruins, 17 Sept 1960 1m (Çaglar 1965, 1968); – Birgi (n Ödemis) [30], March 1960 1 ind (Osborn 1963), – Gumuldur [31], 15 April 1969 1m (Felten et al. 1977), Incirli pit, 5 ind (Albayrak 1993), – Smirne (= Izmir) [32], 1870 1m (Doria 1887), Smyrna (= Izmir), 1 ind (DeBlase 1972). – Kırklareli cave SE of Kıykoy [33], 3 June 1968 (Hůrka 1972); – Demirkoy [34], cave, 12 July 1961 6m, 6mj, 4faL, 6fj (Çaglar 1965, 1968), – Eriklik cave [35], 20 Sept 1963. 4m, 1f (Çaglar 1965, 1968), – Kırklareli [36], cave, 6 Sept. 1961 1mj, 2fa, 1fj (Çaglar 1965, 1968), – Seytanderesi [37], cave, 12 July 1961· 7mj, 3faL, 11fj (Çaglar 1965, 1968), – Sogucak köyu village [38], cave, 20 July 1961 2fj (Çaglar 1965, 1968), – Yeniceköy [39], cave, 20 July 1961· 1m, 1fj (Çaglar 1965, 1968) – Konya· Arak (n Sarkıkaraagac) [*40*], 1 March 1969. 1m, 2f (Felten et al 1977) – Kutahya Aslanapa [41], Arslanar koyu village, Sarıcakaya mevkii (Goldere), 1 ind (Albayrak 1993) – Mugla Farlıya koyü village (NW of Bodrum) [42], 22 March 1969 2m, 4f, 1 ind (Felten et al 1977) – Ordu Yaraşlı koyu village [43], 2 ind (Albayrak 1990) – Sakarya Geyve [44], Ark koyu village, Vaysallar mahallesi, 5 ind (Albayrak 1993) – Sivas Zara [45], 2 ind (DeBlase 1972). – Trabzon Akçaabat [46], cave, 4 April 1969· 9m, 17f (Steiner & Gaisler 1994); – Kirechane [47], cave, 21 June 1960 1f (Çaglar 1965, 1968)

DISTRIBUTIONAL STATUS (Fig. 7). There is a relativelly large number of records (Tab. 1) which supposedly provide a realistic picture on distribution of this species. The record suggests there may be a considerable hiatus, comprising over 500 km, between the Thracian and West-Anatolian populations and that of the Eastern Anatolia. In contrast to the hiatus in the Central Anatolia, the distribution seem continuous in both the other directions, i. e. with that in the Balkans in the western part (Mitchell-Jones et al. in press) and that in the Zagros Mts. and Trascaucasia in the eastern part, respectivelly (DeBlase 1980, Vereščagin 1959).

TAXONOMIC STATUS. Most of the recent authors discussing geographic variation in *R. euryale* (DeBlase 1980, Corbet 1978, Koopman 1994) consider it to be a monotypic taxon, i. e. *R. euryale euryale* Blasius, 1853 (terra typica: Milan, Italy). Hayman & Hill (1971) and Harrison & Bates (1991) arranged the Arabian sample provisionally under the name *R. e. judaicus* Andersen et Matschie, 1904 (t. t.: Jerusalem, Palestine) although they expect that "further research may show it to be a synonym of *R. e. euryale*". *R. e judaicus* is reported from Iraq by Niazi (1976). Felten et al. (1977) arranged provisionally all the European and Persian samples under *R. e. euryale*, those from the Eastern Mediterranean and the Levant to *R. e. judaicus*, and those from the Northwestern Africa to *R e. barbarus* Andersen et Matschie, 1904 (t. t.: Tangiers, Morocco). DeBlase (1980) expects that whole the region of the Middle East is colonized by *R. e. euryale* while *R e judaicus* and *R. e nordmanni* Satunin, 1911 (t. t.: Pavlovsk, Georgia) are not to be considered as valid subspecies. Analyzing the materials from Erzurum and Trabzon provinces of Turkey, Steiner & Gaisler (1994) resignate to identify it as to a subspecific status.

In summary, intraspecific variation in *R. euryale* is still only poorly known and it remains a task of future reseach. In respect to a specific distributional situation (see above), it is just the Turkish material that for such a study can be of a key role.

Rhinolophus mehelyi Matschie, 1901

RECORDS **Original data** Burdur: Taşkapı [1], Insuyu magarası cave, 1 Nov. 1993· net. 1m, CUP. – Içel· Narlıkuyu [2], 29 Oct 1993. remain of 1 ind of *R* cf *mehelyi* in a pellet of cf *Strix aluco* – Kırklareli· small cave in a quarry n Safe suyu spring (3 km NW Sergen) [3], 1 Sept 1996 net 1fa, NMP (spec. No 47961). – **Literary data** Afyon Emirdag [4], cave, 17 April 1964 1m (Çaglar 1965, 1968). – Antalya Side [5], amphitheatre, 13 April 1987 1m (Helversen 1989b). – Balıkesir Erdek [6], cave, 7 Oct 1967 1m, 1f (Steiner & Gaisler 1994), – Havran [7], cave, 17 May 1961: 6f (Çaglar 1965, 1968, DeBlase 1972), – Ilıca Çiftl. [8], 24 Sept 1960, 1f (Felten et al 1977); – Karakaya [9] (Kahmann 1962) – Burdur· Insuyu caves [1], 24 Febr 1969 1f (Felten et al 1977). – Çanakkale. 4 km S of Yalova [10] (Hůrka 1972). – Denizli Dereköy

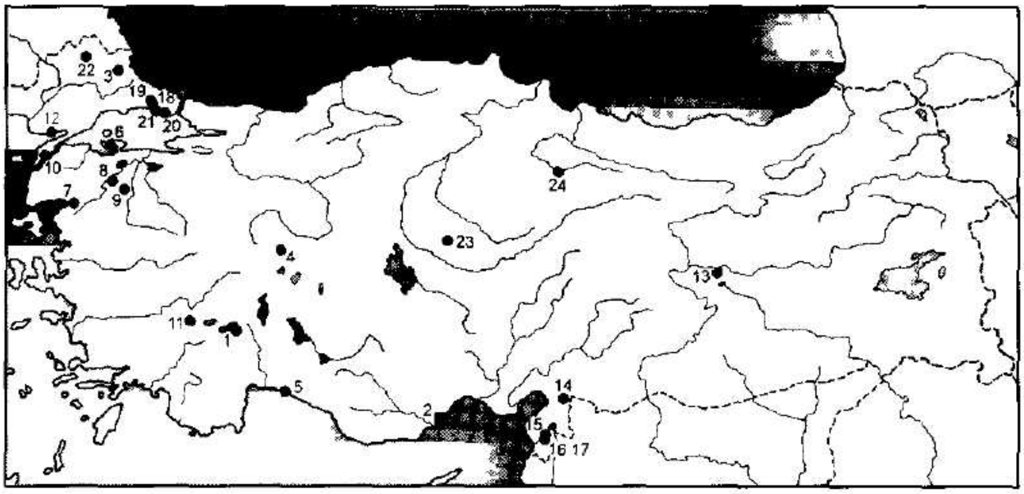

Fig 8 Records of *Rhinolophus mehelyi* in Turkey For symbol explanations see Fig 4

[11], 23 Febr 1969 4m (Kock 1974 Felten et al 1977) – Edirne Ibrice (n Keşan) [12], cave, 4 August 1987 1m (Crucitti 1988) Elazıg Harput [13], Anguzunoba mahallesi, Sarıkayalıklar, 3 ind (Albayrak 1990), – Hatay Akbez bucagı [14], 6 ind (Albayrak 1990), – Antakya [15], aquaeductus St Pierre, 18 Febr 1960 1 ind (Kock 1974), Senpiyer, aquaeductus, 25 Febr 1960 1f (Çaglar 1965, 1968), Harbiye [16], cave (Kahmann 1962), Narlıca koyu village [17], cave, 17 Febr 1960 1m (Kahmann & Çaglar 1960 Çaglar 1965, 1968, Felten et al 1977) – Istanbul Gokceli (n Catalca) [18], cave, 21 May 1964 1f (Çaglar 1965, 1968), – Incegiz (n Çatalca) [19], cave, 29 Jan 1960 1f (Kahmann & Çaglar 1960, Çaglar 1965, 1968, Felten et al 1977), – Kuçukçekmece [20] (Kahmann 1962), – Yarımburgaz [21], cave, 31 July 1962 1f (Çaglar 1965, 1968) – Kırklareli Kayalı koyu deresi valley [22], 2 ind (Albayrak 1993) – Kırşehir Seyfe [23], subterranean cavities, 26–27 July 1983 3m (Helversen 1989b) – Tokat Pazar bucagı [24] Ballıca koyu village, Inderesi magarası cave, 1 ind (Albayrak 1990)

Distributional status (Fig 8) The number of records (24 localities) is not sufficient for a detailed distributional analyses *The records are dispersed almost regularly over whole the country*

Taxonomic status Most authors consider this species monotypic, i e as *R mehelyi mehelyi* Matschie, 1901 (terra typica Bucharest, Romania) In respect to materials from the Middle East this holds true of DeBlase (1972, 1980), Felten et al (1977), Harrison & Bates (1991), Koopman (1994), Steiner & Gaisler (1994) Some other authors (Corbet 1978, Hayman & Hill 1971) suggest the populations from Morocco and/or whole the Northwestern Africa to be considered as a separate West-Mediterranean subspecies *R m carpetanus* Cabrera, 1904 (t t Madrid, Spain)

***Rhinolophus blasii* Peters, 1866**

Records **Original data** Burdur Taşkapı [1], Insuyu magarası cave, 1 Nov 1993 net 23 ind, CUP – Içel Narlıkuyu [2], Cehennem cave, 2 May 1991 net 3m, CUP (leg Hanzal), 3 August 1992 net 6m, NMP (spec Nos 47917–47922) Kırklareli Igneada, Longoz, Mermer magarası cave [3], 9 May 1992 obs several hundred ind (leg Reiter, Andreas & Sadlova), – Igneada, Longoz, Bezergan magarası cave [4], 22 June 1994 net 3m, 1f, CUP, 3 Sept 1996 net 1ma, – small cave in a quarry n Safe suyu spring (3 km NW Sergen) [5], 1 Sept 1996 obs colony ca 300 ind, net 4ma, 7ms, 6fa, 3fs, coll 2ma, 1ms, 2fa, 2fs, NMP (spec Nos 47952, 47954–47958, 47960) – **Zonguldak** Yenice [6], a large cave n railway, 2 July 1994 net 1m, CUP – **Literary data** *Antalya Finike, "Porcupine den" [7], sum 1965 1 ind (Corbet & Morris 1967), – Finike, Cliff cave [8]*, sum 1965 2 ind (Corbet & Morris 1967), – Manavgat river (n Ibradı) [9], under bridge, 28 June 1986 1m, 1f

(Helversen 1989b), – N of Beşkonak [10], 10 Oct 1984 1f (Helversen 1989b), – Perge [11], 9 Oct 1984 1f (Helversen 1989b) – Balıkesir Havran [12], 17 March 1969 2f (Kock 1974, Felten et al 1977), cave, 17 May 1961 5m, 5f, 11 April 1965 3m, 2f (Çaglar 1965, 1968), – Ilıca Çiftl [13], 24 Sept 1960 1m, 2f (Kock 1974, Felten et al 1977) – Burdur 12 km S of Burdur [14], 24 Febr 1969 1m, 1f (Felten et al 1977), – Dutalan [*15*], 25 Febr 1969 3m 6f (Felten et al 1977) – Bursa cave n Olyat [16] Ulu Dag, 19 July 1967 6 ind (Kock 1974) – Hatay Harbiye (n Antakya) [17], cave, 23 Febr 1960 1m, 1f (Kahmann & Çaglar 1960, Çaglar 1965, 1968, Felten et al 1977), – Narlıca [18], cave, 17 Febr 1960 1f (Kahmann & Çaglar 1960) – Içel 8 km NW of Anamur [19], cave, 18 April 1987 2m (Helversen 1989b), – Anamur [20], cave, 17 Febr 1961 1m (Çaglar 1965), Lamas (n Mersin) [21], cave, 22 Febr 1961 1m, 1f (Çaglar 1965, 1968) – Istanbul Incegiz [22], cave, 29 Jan 1960 1f (Kahmann & Çaglar 1960, Çaglar 1965, 1968, Felten et al 1977), – Kuçukçekmece [23] 13 March 1960 2m (Kahmann & Çaglar 1960, Felten et al 1977), – Yarımburgaz [24], cave, 12 March 1960 1m (Çaglar 1965 1968) – Izmir Ahmetbeyli [25], 16 Febr 1969 1m (Felten et al 1977) – Kırklareli Demirkoy, Sarıdere (= Sarpdere) koyu village, Kız magarası cave [26], 6 ind (Albayrak 1993), – Kırklareli [27], cave, 6 Sept 1961 3m (Çaglar 1965, 1968), – Yenicekoy [28], cave, 20 July 1961 1mj, 1fj (Çaglar 1965, 1968) Mugla Farilya (n Bodrum) [29], 22 March 1969 1m (Felten et al 1977)

Rhinolophus blasii / euryale

Original data Hatay Çevlik [30], ancient tombs, 1 July 1997 obs 4 ind sa – Kırklareli Sarpdere, Kız *magarası cave [26], 17 Oct 1993 obs min 5 ind* – ***Literary datum*** *Içel Kulakkoy village [31], abandoned* houses in the forest, Spring 1987 4 ind (van Winden 1988)

DISTRIBUTIONAL STATUS (Fig 9) *R blasii* has been recorded only from the western and southern part of Turkey Considering, that this species is distributed in Transcacaucasia as well as in almost whole territory of Iran and Afghanistan (Bobrinskij et al 1965, DeBlase 1980, Felten et al 1977), it can be assumed that possibly it may come in account in the Eastern Anatolia, too

TAXONOMIC STATUS Many authors (Aellen 1959, Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Hayman & Hill 1971, Koopman 1994, etc) consider this species monotypic in whole range of its distribution, i e as *R blasii blasii* Peters, 1866 (terra typica Italy) Felten et al (1977) found a considerable difference between the European and West-Anatolian samples (belonging to *R b blasii*), and a bigger form from Iran and Afghanistan he consequently described as *R b meyeroehmi* Felten, 1977 (t t Pashtunkot, Afghanistan) The later authors (see above) however, consider

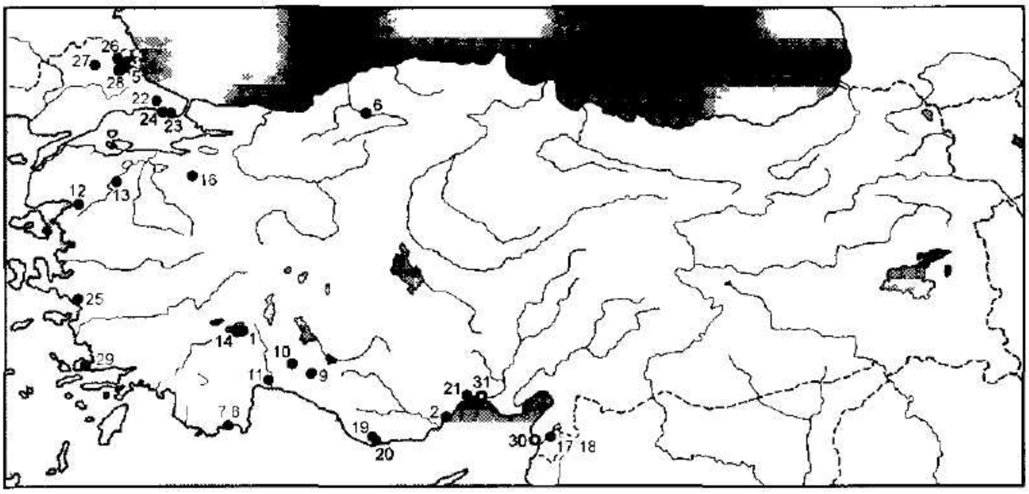

Fig 9 Records of *Rhinolophus blasii* in Turkey For symbol explanations see Fig 4, open symbols denote records of unidentified medium-sized bats of genus *Rhinolophus* (see text)

this form to fall in variation range of the nominotypic form and synonymized *R b meyeroehmi* with *R b blasii* (cf e g Koopman 1994) Anyhow, at least in respect to the African populations, the taxonomic situation of *R blasii* is for of being clear and calls far a detailed revision

Myotis myotis (Borkhausen, 1797)

RECORDS **Original data** Bolu Çepni [1], travertine, remains of 1 ind in pellets of *Bubo bubo* – **Kırklareli** Sarpdere, *Dupnisa magarası cave [2], 16 Oct 1993 net 2m, 2f, CUP*, Summer 1995, PMSL (leg Kryštufek) – Tunceli blind train tunnel in the Euphratus river valley n Derebuk village [3], 27 Oct 1993 coll 1m, CUP, 14 Sept 1995 net 1m, CUP Zonguldak Yenice, a large cave n railway [4] 1 July 1994 obs a colony 500 ind, 2 July 1994 net 2m 13f CUP, obs inside the cave – only 2 ind – **Literary data** Adıyaman Karadut [5], cave 7 June 1992 1 ind *(from owl's pellets)* (Obuch 1994) – Afyon Emirdag *[6]*, cave, 17 April 1964 2f (Çaglar 1965 1969) – Amasya Merzifon [7], Gumuştepe koyu village, 1 ind (Albayrak 1990) – Antalya Finike [8], Clift cave, sum 1965 one intact dentary and some fragments (Corbet & Morris 1967), - Incekum [9], 21 May 1966 3m 1f (Kock 1974, Felten et al 1977), – Kaş [10], 10 June 1966 20f (Kock 1974, Felten et al 1977), Kaş Limanagzı, Hıdırellez magarası cave, 3 ind (Albayrak 1993), – Konakle *[11]*, 21 May 1966 1m (Felten et al 1977), – Side [12], amphitheatre, 3 Oct 1984 and 30 June 1986 (Helversen 1989b) – Aydın Milet [13] 7 August 1986 2m (Spitzenberger 1996) – Balıkesir Havran [14], cave, 17 May 1961 1f, 11 April 1965 7f (Çaglar 1965, 1969), – Havran cave 8 km E [15], 3 August 1986 1m, 3f (Spitzenberger 1996) – Bilecik Bilecik [16] cave, 26 April 1961 13f (Çaglar 1965, 1969) – Burdur Insuyu cave [17] 24 Febr 1969 and 24 June 1969 1m 2f (Felten et al 1977, Spitzenberger 1996) – Bursa Teleferik cukuru hollow [18] (Çaglar 1969) – Çankırı Eskipazar [19] 24 Sept 1965 1m (Kock 1974, Felten et al 1977) – Denizli Derekoy [20] 23 Febr 1969 1f (Felten et al 1977), – Derekoy, cave, 2 km S of Kaklık [21], 25 Febr 1969 1f (Spitzenberger 1996) – Zeytinlik koyu village [22], cave 20 April 1964 1m, 12f (Çaglar 1965, 1969) – Diyarbakır Birkiin magarası cave *[23], 1 km NW Lice, 27 July 1984* 1f (Spitzenberger 1996), – Çermik [24] Kalecik koyu magarası cave, 6 ind (Albayrak 1990), – Hilar magaraları caves (6 km SW Ergani) [25], 26 July 1984 2m (Spitzenberger 1996) – Edirne Lalapaşa [26], Sinankoyu magaraları caves 11 ind (Albayrak 1993) – Erzurum Çamlımagara [27] cave 10 Sept 1967 4 mummies (Steiner & Gaisler 1994) – Elmalı (SW of *Ispir) [28], big cave, 6 August 1983 nursery colony of several houndred specimens (Helversen 1989b)* – Eskişehir Alpu [29], Kelkaya Goleti, 1 ind (Albayrak 1993) – Gumuşhane Mescitli koyu village [30], 5 ind (Albayrak 1990) – Hatay Dermacta koyu village [31] (Çaglar 1969) – Harbiye [32], cave, 23 Febr 1960 1f 21 May 1960 5m, 2f (Kahmann & Çaglar 1960, Çaglar 1965, Felten et al 1977, Spitzenberger 1996), – Narlıca koyu village [33] Karanlık magarası cave, 19 ind (Albayrak 1990) – Içel Gulek Bogazı (Kızıl Tabya) [34] 9 August 1963 1m (Lehmann 1966, Kumerloeve 1975), – Tarsus [35], Say koyu village Delikli magarası cave 6 ind (Albayrak 1993) – Isparta Anamas [36], 27 May 1966 19m, 45f (Kock 1974, Felten et al 1977) Zindan magarası cave 25 June 1969 6m 2f (Spitzenberger 1996) – Istanbul Gokçeli (n Çatalça) [37] cave 26 May 1960 2m 8f (Kahmann & Çaglar 1960, Çaglar 1965 1969, Kock 1974, Felten et al 1977), – Karababa magarası cave (near Çatalça) [38], 3 April 1960 1f (Spitzenberger 1996), – Kuçukçekmece [39], 12 March 1960 1f (Kahmann & Çaglar 1960, Felten et al 1977), Halkalı cave, 15 May 1971 2m, 3f (DeBlase & Martin 1973 Peterson et al 1976), – Ortakoy (n Yalova) [40], ruins of a mill 15 March 1964 2f (Çaglar 1965, 1969) – Saklı koyu village (n Beykoz) [41], cave, 10 July 1960 1m (Çaglar 1965, 1969), – Yarımburgaz [42], cave, *22 April 1959 2f, 12 March 1960 1m, 19 May 1960 2m, 4f, 31 July 1960 7m 1faL* (Çaglar 1965, 1969, Spitzenberger 1996) – Izmir Bergama [43], Asklepion, 4 August 1986 1f (Spitzenberger 1996), – Efes [44], Vedius Gymnasion 6 August 1986 1m (Spitzenberger 1996), Han N Vedius Gymnasion, 2 August 1984 1m (Spitzenberger 1996) – Kars Aralych Bezirk (= vicinity of Aralık) [45] (Satunin 1913), – "das Plateau von Kars" *[46] (Satunin 1913), – Tuzluca [47], 14 Sept 1967 (Peus 1976)* – **Kırklareli** *cave SE of Kiyikoy [48]*, 3 June 1968 2m (Spitzenberger 1996, cf Hůrka 1972) – Kırşehir D Inlimurat magaraları caves [49] 2 ind (Albayrak 1993) Seyfe Golu [50], subterranean cavern, 26–27 July 1983 7m, 5f (Helversen 1989b) – Konya Han [51] 39 km W Konya, 29 July 1984 1m (Spitzenberger 1996), – Sizma koyu [52], Kuzey magarası cave 2 ind (Albayrak 1993) – Nevşehir Derinkuyu [53], Yerebatan şehir underground town, 1 ind (Albayrak 1993) – Derinkuyu, 24 km W [54], 14 July 1975 4f (Spitzenberger 1996), – Goreme [55], ruins, 4 July 1975 1m (Spitzenberger 1996) – Gulşehir [56], Açıksaray harabeleri, 2 ind (Albayrak 1993), Açık Saray, 15 July 1975 1m (Spitzenberger 1996 cf Peus 1978b), – Nevşehir [57], July 1975 (Peus 1978b) – Nigde Agzıkarahan [58], 18 July 1975 1m (Spitzenberger 1996) – Gumuşler [59], Epcik magarası cave, 2 ind (Albayrak 1993) – Ordu Yaraşlı koyu village [60], 17 ind (Albayrak 1990) – Şanlı Urfa Birecik [61], castle, 17 Sept 1958 1m (Çaglar 1965 1969) – Sinop Boyabat Kalesi castle [62], 1 ind (Albayrak 1993) – Tokat Turhal [63], Pazar, Ballıca koyu village, Inderesi mevkii, 7 ind (Albayrak 1990) – Trabzon Akçaabat [64], cave, 12 Sept

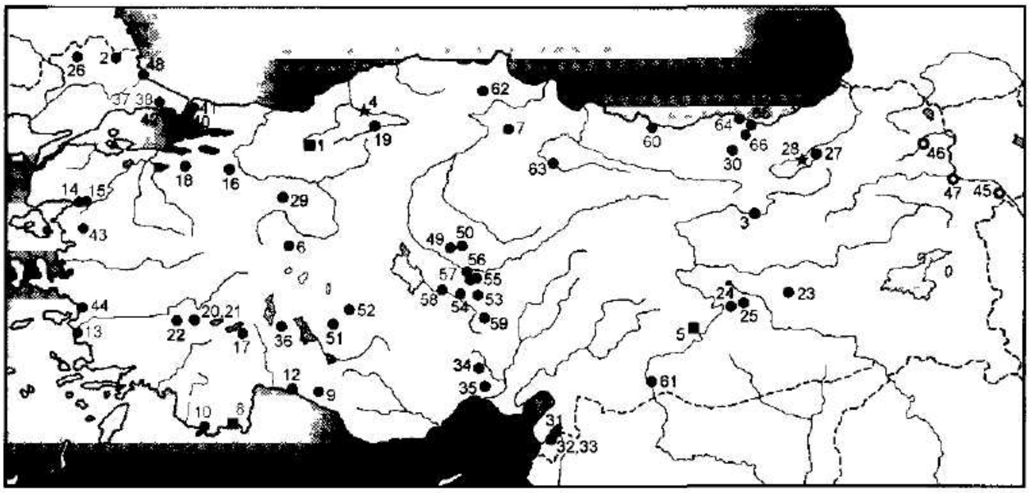

Fig. 10. Records of *Myotis myotis* in Turkey. For symbol explanations see Fig. 4, open symbols denote reidentified records previously refered as of *M. myotis* (see text)

1961 2m, 2f (Çaglar 1965, 1969), 4 April 1969 1f (Steiner & Gaisler 1994), Kirechane [65], cave, 18 May 1960 5m (Çaglar 1965, 1969), – Maçka [66], Bagışlı koyu village, 2 ind. (Albayrak 1990)

Distributional status (Fig. 10). In the Eastern Turkey, *M. myotis* reaches the eastern margin of its distribution range. The records from Armenian Highlands and Caucasus Mts. reported by Satunin (1913) were reidentified as belonging to *Myotis oxygnathus omari* Thomas, 1906 (i. e. *M. blythii omari*) by Kusjakin (1935). Vereščagin (1959) described all the recent and subrecent Caucasian records of the a large-sized *Myotis* as the only species, *M. blythii* (not *M. myotis*). This conclusion has been confirmed also by other Russian authors (Bobrinskij et al. 1965, Strelkov 1972, Pavlinov et al. 1995). With an exception of Armenian Highlands and Mesopotamia, *M. myotis* occurs quite abundant throughout the whole western part of Turkey (63 records).

Taxonomic status. Turkish population of *Myotis myotis* has been many times taxonomically evaluated and analyzed in details. Strelkov (1972) suggested that the area of the Levant and Asia Minor is colonized by the form *M. myotis macrocephalicus* Harrison et Lewis, 1961 (terra typica: Amchite, Lebanon), the form described based on the metrical skull differences in the material obtained from Syria and Lebanon by Harrison & Lewis (1961). In the area of the Balkans and Asia Minor, these authors expected an intermediate form between *M. m. myotis* (Borkhausen, 1797) (t. t.: Thuringia, Germany) and *M. m. macrocephalicus*. *M. m. macrocephalicus* was also mentioned from the Cilician Taurus Mts. by Kumerloeve (1975). Corbet (1978) refers *M. m. myotis* to the European range (incl. the Balkans), *M. m. macrocephalicus* to Lebanon and Palestina, but he give no mention about bats of the Asian part of Turkey (Anatolia). Felten et al. (1977) described a cline increase in metrical characters from the Western to the Eastern Turkey, and therefore, discussed the existence of subspecies *M. m. macrocephalicus* in the Levant. The West-Turkish sample he ranked among nominotypic form of *M. m. myotis*. Harrison & Bates (1991) and Koopman (1994) mentioned from Turkey both the forms: *M. m. myotis* and *M. m. macrocephalicus*. However, Steiner & Gaisler (1994) and Benda (1993) who analyzed the material from Trabzon and Erzurum province, arranged it under the subspecies *M. m. myotis*. The latter author also described cline increase in size throughout the whole Mediterranean from the west to the east with a steep character shift just in Turkey Benda & Horáček (1995a, b) mentioned these phenomena again, and, in respect to it, they have rearranged the North-African form *M blythii punicus* Felten, 1977 in context of the species *M myotis*. Spitzenberger (1996) also identified the shift of metrical characters in Asia Minor, described it with more details, and concluded that the population of *M myotis* occuring in the Cilician lowland, in Hatay (in Turkey), and in the Levantine states belongs to an independent subspecies (i e. *M m macrocephalicus*) whereas the rest of Turkish territory is inhabited just by *M m myotis* (comp Steiner & Gaisler 1994) Arlettaz (1995) and Arlettaz et al (1997) supposed that *M blythii omari* could represent a small-sized marginal form of *M myotis* (similarly as it is the case with *M m punicus*) but it was found improbable by Benda & Horáček (1995a) Nevertheless, to be sure, the species status of *omari*-population is to be reexamined using all available approaches (the non-morphological including)

Myotis blythii (Tomes, 1857)

RECORDS **Original data** Bitlis Alaman Han [1], 16 May 1997 coll 1ma (leg Wolf) – Bolu Çepni [2], a large cavern in a travertine body, 14 June 1990 obs 1 ind – Gumuşhane Guzyurdu [3], a small cave in a mountain pass 2300 m, 15 Sept 1995 obs 1–3 ind (incl a male display) – Erzincan Tercan [4], 16 May 1998 obs nurs colony, coll 1faL, NMP (spec No 48088, leg Bilek) – Hatay Антиохия (= Antakya) [5], 2m, ZIN (spec Nos 9465, 9466, leg Rolle) – Içel Narlikuyu [6], 29 Oct 1993 remain of 1 ind in pellets of cf *Strix aluco* – Kars Ani [7], ruins of Armenian town, 20 May 1997 obs 2 ind in a wall fissure, – Bogakale [8] 21 May 1997 remain of 1 ind in pellets of cf *Strix aluco* (leg Obuch), – 5 km N of Sirbasan [9], small tunnel under railway, 10 Sept 1995 net 1m obs 1 cf m (a male display) – Kirklareli Sarpdere, Dupnisa magarası cave [10], 16 Oct 1993 net 11ma, 4ms, 4fa, 2fs, coll 8m, 2f, CUP, Summer 1995, PMSL (leg Kryštufek) – Sivas Zara [11], Demiryurt, Summer 1995, PMSL (leg Kryštufek) – Van Castle of Van [12], 28 July 1992 net 4m, NMP (spec Nos 47904–47908 cf Benda & Horaček 1995a), – Muradiye Seytan Koprusu cave [13], 27 July 1992 net 1m, NMP (spec No 47903, cf Benda & Horaček 1995a) – **Literary data** Adana S of Duziçi [14], 1914 4f (Spitzenberger 1996), – Toprakkale [15], ruins of crusader castle, 17 August 1977 2 ind (from owl's pellets) (Nadachowski et al 1990) – Adıyaman Karadut [16], cave, 7 June 1992 5 ind (from owl's pellets) (Obuch 1994), – Kuyucak bucagı [17], 1 ind (Albayrak 1990) – Agrı Dogubeyazit, Ishakpaşa Saray [18] 21 July 1984 1m (Spitzenberger 1996), – Karasu spring [19], 29 June 1960 (Theodor 1967) – Antalya Alara hanı [20] 16 August 1986 1m, 1f (Spitzenberger 1996, cf Spitzenberger 1994), – Agullu (1 km N) [21], 13 August 1986 1m (Spitzenberger 1996), – Kaş [22], 10 June 1966 6f (Kock 1974, Felten et al 1977) – Artvin Ardanuç [23], gorge, 12 August 1983 1m (Helversen 1989b) – Aydın Milet (n Soke) [24], ruins, 23 Sept 1960 2m (Çaglar 1965, 1969), Milet, 7 August 1986 1m (Spitzenberger 1996) – Balıkesir Denkçiler mahallesi [25], 1 ind (Albayrak 1993), – Erdek [26], cave, 7 Oct 1967 1m, 4f (Steiner & Gaisler 1994), Manyas Golu [27], 24 August (July) 1960 4m (Kock 1974, Felten et al 1977) – Bingol Kigı [28], Kerek magarası cave, 13 July 1984 13f (Spitzenberger 1996) – Bitlis 7 miles SW of Tatvan [29], old ruins, 27–28 July 1954 *7m, 2f (DeBlase & Martin 1973), – between Çanak duzu and Anadere [30], 17 July 1984 2m* (Spitzenberger 1996) – Eleman Hanı [1], 3 ind (Albayrak 1990), Alaman hanı, 16 July 1984 3m, 2f (Spitzenberger 1996), – Han [31], 2 km N Bitlis, 15 July 1984 1m (Spitzenberger 1996) – Bolu Mudurnu yolu [32], 10 km, 1 ind (Albayrak 1993) Çanakkale Yalova [33], hill SW, 30 May 1967 2m (Spitzenberger 1996) – Çankırı Ilgaz [34], under bridge over the Devrez Çayı, 15 August 1983 1ma (Helversen 1989b) – Diyarbakır Çermik [35] cave, 21 Sept 1962 7m, 4f (Çaglar 1965, 1969), Kalecik koyu magarası cave, 1 ind (Albayrak 1990), – Ergani [36], Sesverenpinar koyu village, Han magarası cave, 2 ind (Albayrak 1990), – Ergani [37], Hilar magarası cave (6 km SW), 26 July 1984 4m (Spitzenberger 1996), – Surlar [38], Yedikardeşler Burcu, 1 ind (Albayrak 1990) – Edirne Ibrice (n Keşan) [39], cave, 4 August 1987 1f (Crucitti 1988), – Lalapaşa [40], Sinankoyu magaraları caves, 1 ind (Albayrak 1993) – Elazıg Harput kalesi castle [41], Dere hamamı, 1 ind (Albayrak 1990) – Erzincan Başpınar [42], 13 km E, 9 July 1984 2m (Spitzenberger 1996), – Tercan [4], Mamahatun Kervansarayı, 20 ind (Albayrak 1990) – Erzurum Çamlımagara [43], cave, 10 Sept 1967 2 mummies (Steiner & Gaisler 1994), – Hasankale [44], Koprukoy bucagı, Çobandede koprusu bridge, 1 ind (Albayrak 1990), – Sohun Dere [45], under bridge, 7 August 1983 1m (Helversen 1989b) – Eskişehir Alpu [46], Kelkaya goleti, 1 ind (Albayrak 1993) – Hatay Akbez bucagı [47], 9 ind (Albayrak 1990), – Antakya [4] (Harrison 1964), – Belen [48], above the Topbogazı Gecidi pass, 9 June 1992 1 ind (from owl's pellets) (Obuch 1994), – Dermacta koyu village [49] (Çaglar 1969), – Harbiye (n Antakya) [50], cave, 21 May 1960 8f (Çaglar 1965, 1969, Felten et al. 1977, Spitzenberger 1979, 1996); – Narlıca koyu village [51], Karanlık magarası cave, 20 May 1960 4m (Çaglar 1965, 1969), 12 Sept 1971. 2m, 1f (Spitzenberger 1996, cf. Felten et al. 1977), 16 ind (Albayrak 1990) – Içel Anamur [52], Bugulu magarası cave, 1 ind (Albayrak 1993). - Tarsus [53], Say koyu magaraları caves, 1 ind (Albayrak 1993) – Isparta. Anamas [54], 27 May 1966 and 25 June 1969 4m, 10f (Kock 1974, Felten et al. 1977), Zından magarası cave, 25 June 1969. 2m (Spitzenberger 1996) – Istanbul. Gokçeli (n Çatalca) [55], cave, 26 May 1960 1m, 4f (Çaglar 1965, 1969, Felten et al 1977), – Küçükçekmece [56] (Çaglar 1969, Felten et al 1977), Halkalı cave, 15 May 1971. 9m, 1f (DeBlase & Martin 1973, Peterson et al 1976); – Yalova [57], Sogucak koyu magaraları caves, 4 ind (Albayrak 1993); – Yarımburgaz [58], cave, 19 May 1960 1m, 6f, 31 July 1960. 5m, 14 f (2faL) (Çaglar 1965, 1969), 31 July 1960. 1f (Spitzenberger 1996) – Izmir Asklepion (n Bergama) [59], ruins, 17 Sept 1960 1m, 1f (Çaglar 1965, 1969), 4 August 1986 2m, 1f (Spitzenberger 1996), – Bergama [59], hellenistic aqueduct, 5 August 1986· 1m (Spitzenberger 1996), – Gumuldur [60], Incirli pit, 3 ind (Albayrak 1993) – Kars. Aralych-Bezirk (= vicinity of Aralık) [61] (Satunin 1913; mentioned as *M. myotis*, but reexamined by Kusjakin 1935), – Tuzluca [62], mine gallery, 14 Sept 1967. 5m, 2f (Steiner & Gaisler 1994, cf Peus 1976) – Kırklareli: Alpullu [63], Mimarsinan koprusu bridge, 1 ind (Albayrak 1993), – cave SE of Kiyikoy [64], 3 June 1968 3m (Spitzenberger 1996, cf Hůrka 1972), – Eriklice koyu village [65], 1 ind (Albayrak 1993) – Kırşehir. D Inlimurat magaraları caves [66], 1 ind (Albayrak 1993), – Seyfe Golu [67], subterranean cavern, 26 July 1983· 1f (Helversen 1989b) – Kocaeli. Gebze [68], old building, 1 June 1964 3f (Çaglar 1965, 1969) – Konya Sızma koyu village [69], Obruk magarası cave, 2 ind. (Albayrak 1993) – Kutahya Sapuncupinar [70], Yeniçe çiftligi, 3 ind (Albayrak 1993) – Muş Dere Mahallesi [71], 10 ind (Albayrak 1990); – Sutluce koyu koprusu bridge [72], 6 ind. (Albayrak 1990). – Nevşehir. Derinkuyu [73], 24 km W, 14 July 1975 2f (Spitzenberger 1996); – Sarihan [74], 17 July 1975. 2m (Spitzenberger 1996) – Nigde Agzıkarahan [75], 18 July 1975 3m (Spitzenberger 1996) – Ordu Yaraşlı koyu village [76], 2 ind (Albayrak 1990) – Siirt Gökçebak koyu village [77], 1 ind. (Albayrak 1990) – Tokat Turhal [78], Pazar, Ballıca (Abayel) koyu village, Inderesi mevkii, 6 ind (Albayrak 1990) – Van. Castle of Van [12], 25 ind (Albayrak 1990), 19 July 1984 1m (Spitzenberger 1996); – Isle Akdamar [79], 18 July 1984 4m (Spitzenberger 1996); – Kızıltaş [80], 6 km S, 19 July 1984 2m (Spitzenberger 1996), – narrow cliff cave on the mountainside at Van [81], 14 July 1954 7m, 15f (DeBlase & Martin 1973) – Yozgat Şefaatlı [82], Armagan koyu village, 3 ind (Albayrak 1993) – Anatolia (undef.)· "Charne bei Jarbaschi, in der Charunje Ebene, Kleinasien", Spring 1914 (Wettstein 1926) [= S Duzici (Adana dist) sensu Spitzenberger (1996)], – Ulukista (?= Ulukışla, C-Anatolia), 1906 (Topál 1971)

DISTRIBUTIONAL STATUS (Fig. 11). *M. blythii* has been found in whole Turkey, also in arid areas, with an exception of the Upper Mesopotamia. It is the second most frequent bat species in Turkey, just after *R. ferrumequinum* (Tab. 1).

TAXONOMIC STATUS. The Persian form *M. myotis omari* Thomas, 1906 (terra typica: Derbent, Iran) was rearranged under the species *M. blythii* by Kusjakin (1935; comp. Kuzjakin 1934). Harrison & Lewis (1961) synonymized *M. myotis risorius* Cheesman, 1921 (t. t.: Shiraz, Iran) with *M. m. omari* and also confirmed their belonging to *M. blythii* (they considered *M. blythii omari* as a subspecies distributed over the whole Middle East). Hayman & Hill (1971) considered *M. blythii oxygnathus* (Monticelli, 1885) (t. t.: Basilicata, Italy), the form first assigned to *M. blythii* by Ellerman & Morrison-Scott (1951), as a subspecies inhabiting a large territory, from Morocco, through the Southern Europe, the Middle East to the Central Asia. Topál (1971) confirmed the synonymy of Indian *M. blythii blythii* (Tomes, 1857) with *M. dobsoni* Trouessart, 1879, and also the synonymy of *M. b. risorius* and *M. b. omari*, which range is hence from Crete, through Asia Minor, Caucasus Mts. and Transcaucasia to the Persian mountains incl. Kopetdag Mts., i. e. the southaestern to *M. b. oxygnathus* inhabiting Europe up to Crimea. The first, who analyzed the geographic variation of *M. blythii* over whole range of its distribution was Strelkov (1972). He has considered the subspecies *M. b. oxygnathus* distributed in continental Europe from Spain to Crimea (incl. Turkish Thrace), and *M. b. omari* inhabiting Caucasus Mts. and Transcaucasia, Asia Minor, the Western Turkmenistan and the whole Middle East, the Mediterranean islands and the Northern Africa. Corbet (1978) inclined to this opinion (without mentioning Anatolian populations). Felten et al. (1977) subdivided the Anatolian population into two groups, corresponding to subspecies: *M. b. oxygnathus* (continental Europe and the Western Anatolia) and *M. b. omari* (Eastern Anatolia eastward of

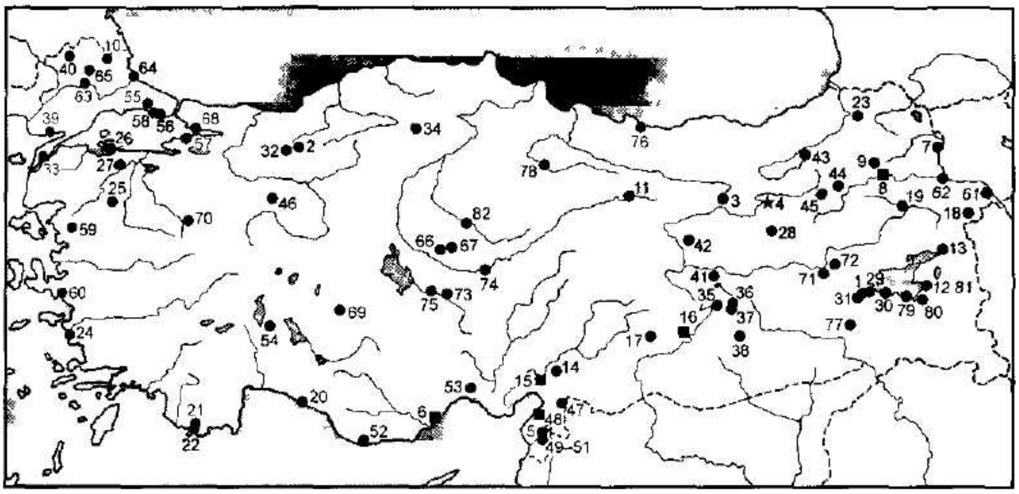

Fig 11 Records of *Myotis blythii* in Turkey. For symbol explanations see Fig. 4

Hatay, and in the whole rest of range in the whole Middle East), the opinion which, at least as Turkey is considered, was adopted also by DeBlase (1980), Harrison & Bates (1991) and Koopman (1994). *Steiner & Gaisler (1994) resignated to classify the subspecific status of their samples from* provinces of Balikesir, Kars and Erzurum.

Benda & Horáček (1995a, b) found a cline increase in metrical characters from the west to the east throughout whole the Mediterranean terminating in Transcaucasia and Iran, with a step shift in Asia Minor that separates *M. b. oxygnathus* from *M. b. omari* (which can thus be expect also in the Eastern Turkey). Spitzenberger (1996) describes the same trend in Anatolia from the west to the east, though she does not distinguish individual subspecies.

In the context of taxonomical status of *M. blythii* in Turkey it is important to give a note on *M. blythii lesviacus* Iliopoulou, 1984, a form described from the Lesbos (= Midilini) island, Greece (Iliopoulou-Georgudaki 1984), ca 10 kilometers distant from the Turkish coast. This description was based on differences of the island form from both that of Peloponnese (as a sample of "continental" *M. b. oxygnathus*) and of Crete (*M. b. omari*). *M. blythii lesviacus* was proposed as intermediate form between both of the subspecies. However, subspecific status of that form is doubted by later authors (Benda & Horáček 1995b, Arlettaz et al. 1997) though accepted by Koopman (1994).

In conclusions, *M. blythii* is to be looked upon as a taxon which, in the Mediterranean region, exhibits a considerable morphometric variation. Its general pattern includes: (a) cline increase in size from the west to the east and (b) supposedly stepped shift in the region of Middle East that terminates with the largest form of the species, *M. b. omari*. The Northwest-African population (*punicus*) belongs rather to *M. myotis* than to *M. blythii* (cf. Benda & Horáček 1995a, b, Arlettaz et al. 1997 for details).

Myotis bechsteinii (Kuhl, 1817)

RECORDS **Original data** Kırklareli Sarpdere, Dupnısa magarası cave [1], 16 Oct 1993 net 1m, CUP, 17 Oct 1993 net 1m, PMSL, – Velika Koprusu bridge (8 km SW of Demirkoy) [2], 5 May 1992: net 1 ind (leg Reiter, Andreas & Sadlova) – **Literary data**. Antalya Kopru Irmagı (N of Beşkonak) [3], gorge, 1m

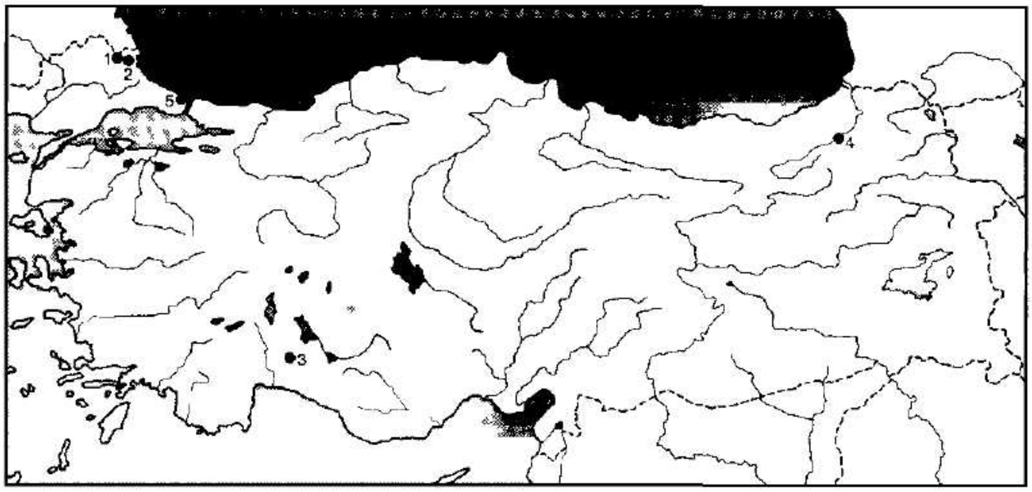

Fig. 12. Records of *Myotis bechsteinii* in Turkey. For symbol explanations see Fig. 4.

(Helversen 1989b) – Artvin: Yusufeli, Kılıçkaya bucagı [4], 1 ind. (Albayrak 1990) – Istanbul: Belgrad forest [5], tree hollow, 23 June (year undef.) 1fa (Kahmann 1962).

Distributional status (Fig. 12). More records of this rare species are available only from Thrace. One East-Pontic record (No. 4) may refer to the southeastern part of distribution range that covers Caucasus Mts., Transcaucasia and Kopetdag Mts. (DeBlase 1980, Vereščagin 1959). The Pamphylian record (No. 3) is the southernmost record of this species in whole distribution range (cf. Corbet 1978, Mitchell-Jones et al. in press). It suggests that *M. bechsteinii* may occur even in the region where it was not expected.

Taxonomic status. Because of quite a restricted number of records (except for Central Europe), the geographic variation of *M. bechsteinii* has not yet been described. The population of the whole distribution range is generally arranged under nominotypic form *M. bechsteinii bechsteinii* (Kuhl, 1817) (terra typica: Hanau, Germany) (Corbet 1978, DeBlase 1980, Koopman 1994).

Myotis nattereri (Kuhl, 1817)

Records. **Original data**. İçel: Bozagaç [1], Yalan Dünya magarası cave, 30 Oct. 1993: net 2m, CUP, Narlıkuyu [2], Cennet cave, 4 August 1992: net 1f, NMP (spec. No. 47924), – Silifke [3], Castle of Silifke, 1 August 1992: obs. colony ca 15 ind., net 3f, coll. 1f, NMP (spec. No. 47916). – Kars: 5 km W of Sarıkamış [4], small tunnel under railway, 11 Sept. 1995: coll. 1m, CUP (previously mentioned as *M. schaubi*, viz. Benda & Horaček 1998) – Kırklareli: Sarpdere, Dupnisa magarası cave [5], 16 Oct. 1993: net 1m, CUP – **Literary data**. Antalya: Alanya [6], 1m (leg. Issel, Benda & Horáček 1995a, cf. Horaček & Hanák 1984), – Alara hanı [7], 16 August 1986 (Spitzenberger 1994), – Beşkonak [8], small creek, 10 Oct. 1984: 1f (Helversen 1989b), Incekum [9], 21 May 1966: 1m, 9f, SMF (Kock 1974, Benda & Horaček 1995a, cf. Horaček & Hanák 1984), Manavgat [10], ancient aqueduct, 29–30 June 1986: 1m, 1f (Helversen 1989b), – Side [11], large vault in amphitheatre, 13 April 1987: 1m (Helversen 1989b), – Termessos [12], abandoned building, 30 Sept. 1984: 1m (Helversen 1989b) – Artvin: Ardanuç [13], small cave, 12 August 1983: colony of 40–50 ind. (3faL, 5fs, 3j) (Helversen 1989b) – Çanakkale: Eceabat [14], Kılıtbahır village, 14 July 1984: 2mj, 1fa (Albayrak 1993, 1993a), – Seddulbahır [15], 1 June 1967: 7f, NMW (Benda & Horáček 1995a, Peus 1978a, cf. Horaček & Hanák 1984) – Denizli: Aşagıdere köyü village [16], 30 August 1984: 5ma, 7fa (Albayrak 1993, 1993a) – Van: Muradiye [17], Bendimahi, rock chimney, 5 June 1992: 1 ind. (from owl's pellets) (Obuch 1994).

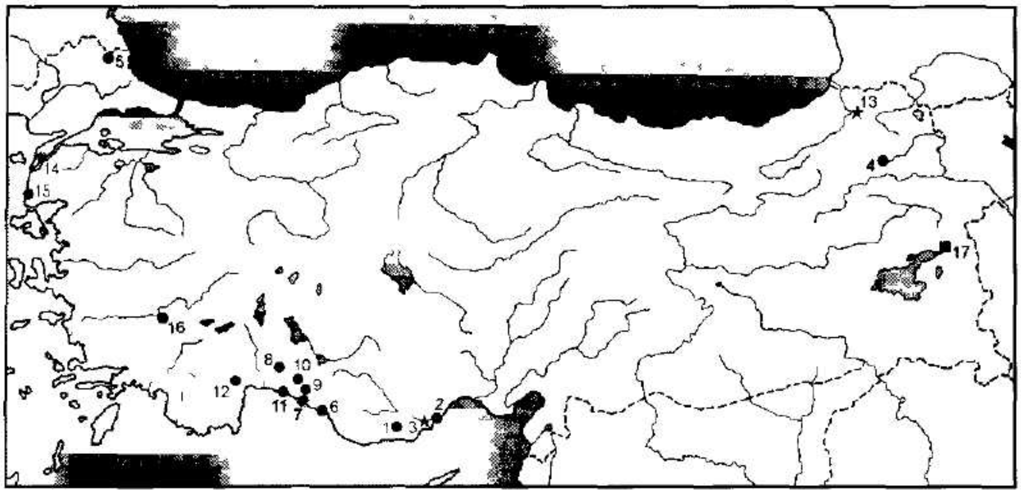

Fig. 13. Records of *Myotis nattereri* in Turkey. For symbol explanations see Fig. 4

Distributional status (Fig. 13). According up to now data, *M. nattereri* inhabits Turkey in two distinct populations, the Western population occuring in Thrace and in the Mediterranian coast, and the eastern one that extends the population of Transcaucasia and the Northern Iran.

Taxonomic status. Corbet (1978) reported four subspecies. *M. nattereri nattereri* (Kuhl, 1817) (terra typica: Hanau, Germany) from the European territory, *M. n. araxeus* Dahl, 1947 (t. t.: Araxes River valley, Armenia) from Armenia and the Northwestern Iran, *M. n. tschuliensis* Kusjakin, 1935 (t. t.: Chuli, Kopetdag Mts., Turkmenistan) from Kopetdag Mts., and *M. n. hoveli* Harrison, 1964 (t. t.: Aqua Bella, Palestine) from Palestine. At that time, there was no records of *M. nattereri* in Asian part of Turkey (cf. Kumerloeve 1975). Strelkov et al. (1978) confirmed that *M. n. tschuliensis* from Turkmenistan and Transcaucasia is larger in cranial measurements than members of the European populations. Rzebik-Kowalska et al. (1978) reported *M. nattereri* from the Northern Iraq, and pointed out its differences from the nominotypic form.

Horáček & Hanák (1984) in respect to sympatric occurrence distinguished a small and a big form of the *M. nattereri*-group in Armenian Highlands of Armenia and Iran (cf. also Harrison 1963) as separate species: *M. schaubi araxenus* and *M. nattereri*. The differences among the local populations of the latter species in the Middle East were found to substantiate their subdivision in two subspecies, i. e. *M. n. tschuliensis* (Kopetdag Mts., Transcaucasia, Northern Iraq and the Northern Iran), and *M. n. nattereri* (Europe, from Spain to Ural Mts., the Western Turkey up to Israel, and the Northwestern Africa). Helversen (1989b) found all his Turkish material (incl. that from province of Artvin) to fall in variation range of *M. n. nattereri*. Albayrak (1993a) arranged all his West-Turkish samples under the form *M. n. hoveli*, according to the criteria of Horáček & Hanák (1984) who, of course, found the differences between *M. n. hoveli* and *M. n. nattereri* much less apparent than those between *M. n. nattereri* and *M. n. tschuliensis* and included *M. n. hoveli* in synonymy of *M. n. nattereri*, a view adopted also by Koopman (1994). Benda & Horáček (1995a) described a cline shift in metrical characters in the whole areal of distribution, from the west to the east, and accepted the conclusions mentioned above.

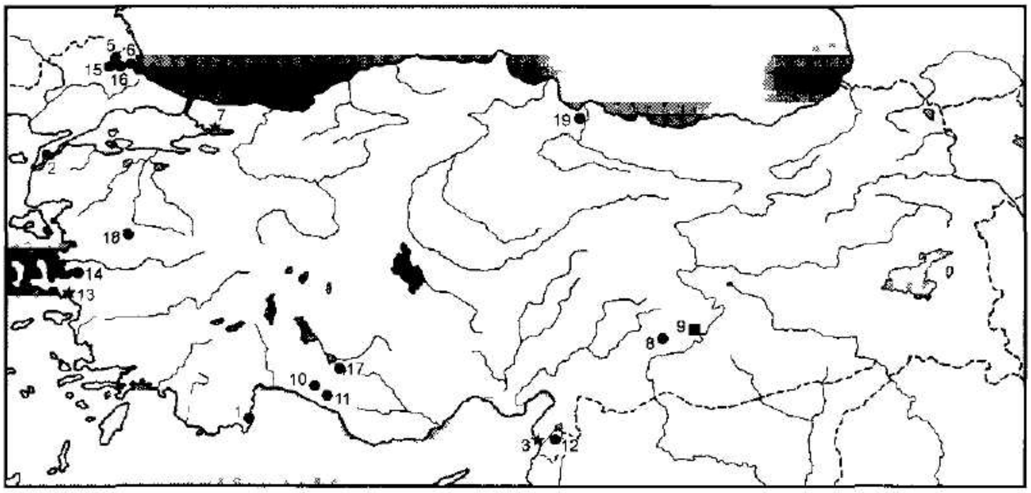

Fig 14 Records of *Myotis emarginatus* in Turkey For symbol explanations see Fig 4

Consequently, most of the territory of Turkey is inhabited by a nominotypic subspecies *M. n. nattereri* that exhibits here the characters approaching the state in its southernmost populations ("*hoveli*"). Besides it, however, *M. n. tschuliensis* can be predicted for the territory of the Eastern Turkey, and, in the Armenian Highlands and/or Turkish Kurdistan, also *M. schaubi araxenus* can be expected.

Myotis emarginatus (Geoffroy, 1806)

RECORDS **Original data** Antalya Olympos [1], 31 Aug 1984 1m, NMW (spec. No 34373) – Çanakkale Yalova [2], ruins of a castle 4 km to S, 31 May 1967. 1f, NMW (spec No. 11815) – Hatay Çevlik [3], ancient tombs, 20 May 1995: 11fa, NMP (spec Nos 47933–47943, cf Benda 1996) – Kırklareli Kıyıkoy (= Midye) [4], a cave S, 2 June 1968 7f, 1 s i, NMW (spec Nos 13419, 13423, 13426–13431), – Sarpdere, Dupnisa magarası cave [5], 16 Oct 1993 net 1m, CUP, – small cave in a quarry n Safe suyu spring (3 km NW Sergen) [6], 1 Sept 1996 net 1m, NMP (spec No 47959) – Kocaeli Hereke [7], cave, 25 June 1969 6fa, SNMB (leg Matoušek, cf Benda 1996) – **Literary data** Adıyaman Indere (Zey) koyu village [8], 3 ind (Albayrak 1990), – Karadut [9], cave, 7 June 1992 3 ind (from owl's pellets) (Obuch 1994) – Antalya bridge over Manavgat river (n Ibradı) [10], 28 June 1986 3j (Helversen 1989b), - Manavgat [11], ancient aquaeduct, 29 June 1986 1mj (Helversen 1989b) – Hatay Altınozu [12], Kozkalesi koyu village, 4 ind (Albayrak 1990) – Izmir Gumüldur [13], Incirli pit, nurs colony ca 200 ind, coll 36 ind (Albayrak 1993), – Smirne (= Izmir) [14], 1870 "numerosi esemplari" (Doria 1887) – Kırklareli Kazankaya, Şeytanderesi cave [15], 12 July 1961 2mj, 1faL, 4fj (Çaglar 1961c, 1965, 1969), Yenicekoy [16], cave, 20 July 1961. 1fj (Çaglar 1961c, 1965, 1969) – Konya Uçpınar (SW of Bozkır) [17], 27 June 1986 1m (Helversen 1989b) – Manisa Demirci [18], Çataloluk koyu village, Delikyar magarası cave, 8 ind (Albayrak 1993) – Samsun Kelkaya mahallesi [19], Asaragaç koyu village, 9 ind (Albayrak 1990).

DISTRIBUTIONAL STATUS (Fig. 14). *M. emarginatus* occurs in relatively humid regions of Turkish coast and of the Euphrates River valley (cf. Benda 1996).

TAXONOMIC STATUS. Geographic variation over whole the range of distribution has as yet not been studied in *M. emarginatus* (Topál in press). Kumerloeve (1975) considered the samples from Thrace to belong to the nominotypic form *M emarginatus emarginatus* (Geoffroy, 1806) (terra typica: Charlemont, France). Corbet (1978) reported subspecies *M. e emarginatus* for the European range, and *M. e. desertorum* (Dobson, 1875) (t. t. Jalq, Baluchistan) for Iran and the Central Asia. At the time, no records were available from Asia Minor (cf. Kumerloeve 1975). Based on differences in colouration, Strelkov et al. (1978) distinguished in the sample from Turkmenistan, two different forms, viz. *M. e. desertorum* in Kopetdag Mts. and in the valley of Murghab River, and *M. e. saturatus* Kuzjakin, 1934 (t. t. Tashkent, Uzbekistan) in the Kugitangtau range (Eastern Turkmenistan). DeBlase (1980) reported *M. e. emarginatus* in the west of Iran. Harrison & Bates (1991) attributed the same name to the Arabian population (with an exception of Oman). The same opinion was presented also by Koopman (1994).

Topál (in press) tends to suppose that Europe up to Caucasus Mts. is inhabited by *M. e. emarginatus*, and Caucasus Mts., (the Great) Armenia and Kopetdag Mts. by the form *M. e. turcomanicus* Bobrinskii, 1925 (t. t. Murghab River valley, Turkmenistan). The form *M. e. desertorum* could occur in Baluchistan and Oman, and *M. e. saturatus* in the Central Asia.

Myotis mystacinus (Kuhl, 1817)

RECORDS. **Original data.** Bolu: Çepni [1], travertine, remains of 1 ind. in pellets of *Bubo bubo*. – İçel: Narlıkuyu [2], 29 Oct. 1993, remain of 1 ind. in pellets of cf. *Strix aluco*. – Kars: Аралых (= Aralık) [3], 2m, 2f, 2 s. i., ZIN (spec. Nos. 9002–9005, 9011–9013, leg. Satunin, rev. Benda, cf. Strelkov 1983b), – 5 km N of Sırbasan [4], small tunnel under railway, 10 Sept. 1995, net, 2m, NMP (spec. Nos. 48094, 48095). – Kırklareli: Sarpdere, Dupnisa magarası cave [5], Summer 1995, PMSL (leg. Kryštufek). – Van: Castle of Van [6], 28 July 1992, net, 4m, NMP (spec. Nos. 47912–47915). **Literary data.** Adıyaman: Karadut [7], cave, 7 June 1992, 1 ind. (from owl's pellets) (Obuch 1994). – Ankara: Kırmır Çayı (S of Kızılcahamam) [8], over a river, 17–19 June 1986, 2m, 2f (Helversen 1989b). – Antalya: Beşkonak [9], valley, 10 Oct. 1984, 1f (Helversen 1989b). – bridge over the Manavgat river (n. İbradı) [10], 28 June 1986, 1 mummy (Helversen 1989b). – Bitlis: Tatvan [11], Karşıyaka mahallesi, 20 July 1977, 1ma, 8fa, 1fj (Albayrak 1990, 1991). – Bursa: Nilufer Çayı (S of Uludag) [12], 21–22 July 1983, 4f (Helversen 1989b). – Çankırı: Devrez Çayı (n. Ilgaz) [13], under a bridge, 15 August 1983, 1m (Helversen 1989b). – Erzurum: Çoruh valley betw. Ispir and Yusufeli [14], 5 August 1983, 1f (Helversen 1989b). – NW of Ispir [15], 4 August 1983, 1m (Helversen 1989b). – Sohun Dere [16], a rocky valley, 7 August 1983, 2m, 4f (Helversen 1989b). – İçel: n. Mersin [17], 8 Nov. 1913, 1m (Kumerloeve 1975). – Izmir: Seferihisar [18], Doganbey Burnu, 10 June 1985, 3mj, 3fa, 2fj (Albayrak 1991, 1993). – Smirne (= Izmir) [19], 1870, 2 ind. (Doria 1887). – Kırklareli: 5 km W of Igneada [20], 13 May 1967 (Hůrka 1972). – Konya: Uçpınar (SW of Bozkır) [21], 27 June 1986, 1m, 1f (Helversen 1989b). – Muş: Alpaslan D.U.Ç. (= state farm) [22], 8 July 1979, 1ma, 1mj, 10fa (Albayrak 1990, 1991). – Rize: Hemşin (= Ortakoy) (Çaglar 1969) = Çat (n. Çamlıhemşin), 4, 13 August 1967, nursery colony (Peus 1976) – this material was reexamined by Steiner & Gaisler (1994) as *Myotis brandtii* (see below). – Van: Castle of Van [6], 27 July 1977, 1fa, 1fj (Albayrak 1990, 1991). – NE Anatolia (no exact loc.), ind. in Russian collections (Çaglar 1965, see above [3], resp. Strelkov 1983b).

Myotis cf. *mystacinus*

RECORDS. **Original data.** Artvin: Murgul, Damar [23], in the village, 3 Sept. 1995, det. min. 10 ind. – Bursa: Uludag, 1450 m [24], 29 July 1994, det. 1 ind., – Uludag, 1700 m [25], 28 July 1994, det. 1–2 ind. – Istanbul: Yalova Termal [26], over a brook below a dam, 24 June 1990, det. 1 ind. – Kocaeli: Fevziye [27], 4 km S of Altınova, 23 June 1990, det. – Trabzon: Sumelas [28], 25 Oct. 1993, det. min. 1 ind.

DISTRIBUTIONAL STATUS (Fig. 15). *M. mystacinus* inhabits all regions of Turkey except for Central Anatolian steppes in the middle part of Asia Minor, and it belongs there, as in the Balkans, among the most common bat species (Tab. 1). The Turkey is the southern margin of its Mediterranean distribution range, that pass then through Persian Azerbaijan, Zagros, Elborz and Kopetdag Mts. into the Central Asia (DeBlase 1980, Kock 1996, Strelkov 1983a, b). Dobson (1878) reported a specimen of *M. mystacinus* coming from a southern region (Syria) in the collection of British Museum but Harrison (1964) and Harrison & Bates (1991) do not comment this specimen and do not consider this species to be a member of Arabian fauna (but cf. Qumsiyeh 1996).

TAXONOMIC STATUS. Taxonomy of *M. mystacinus*-group was several times discussed, supplemented and revised (Hanak 1965, Kuzjakin 1950, Topal 1958). Among other, these studies resulted in exlusion of the form *Myotis brandtii* (Eversmann, 1845) from context of the species *M. mystacinus* (Gauckler & Kraus 1970, Hanak 1970) and revision of the European findings of *M. ikonnikovi* Ognev, 1912 (terra typica. Ussuri River valley, Russian Far East) (viz. Abelencev et al. 1956, Kvartirnikov 1957), that were included into *M. mystacinus* (Hanak 1965). Stubbe & Chotolochu (1968) proposed an overall classification of Palearctic populations of *M. mystacinus* (within the species concept sensu Ellerman & Morrison-Scott 1951) but they did not included Caucasian and Turkish populations. Corbet (1978) distinguished several subspecies in the whole range of distribution: *M. mystacinus mystacinus* (Kuhl, 1817) (t. t. Germany) in Europe and the Western Asia (incl. Turkey and Caucasus Mts.), *M. m. transcaspicus* Ognev et Heptner, 1928 (t. t. Mikhailovskoj, Kopetdag Mts., Turkmenistan) in Kopedag Mts. and Central Asia, *M. m. przewalskii* Bobrinskoj, 1926 (t. t. Moldja River valley, Eastern Turkestan, China) in the Western China and Mongolia, *M. m. meinertzhageni* Thomas, 1926, (t. t. Ladak, Kashmir) in Himalayas and Pamir Mts. and *M. m. sogdianus* Kuzjakin, 1934 (t. t. Tashkent, Uzbekistan) in the Central Asia. The most extensive revision was published by Strelkov (1983a). He analyzed the population of the Eastern Europe and the Northern Asia and subdivided it in four subspecies: *M. m. mystacinus* inhabiting the forest zone of Europe and of the Southwestern Siberia, *M. m. popovi* Strelkov, 1983 (t. t. Crimea, Ukraine), occuring in Moldavia, in the Southern Ukraine and in Ciscaucasia, so mostly in steppe areas, *M. m. aurascens* Kusjakin, 1935 (t. t. Vladikavkaz, Southern Russia) inhabiting the forest zone of Caucasus Mts., *M. m. przewalskii*, that occurs in the Middle Asia, Mongolia and the Western China (in two size-types, comp. Kruskop & Borissenko 1996). Koopman (1994) has distinguished more subspecies in the Asian part of the distribution range: *M. m. transcaspicus*, *M. m. sogdianus*, *M. m. nipalensis* (Dobson, 1871) (t. t. Katmandu, Nepal), *M. m. davidi* (Peters, 1869) (t. t. Peking, China) in addition to *M. m. przewalskii* mentioned to that region by Strelkov (1983). Recently, based on the Strelkov's (1983a) proposal, was described a new subspecies, *M. m. mongolicus* Kruskop et Borissenko, 1996 (t. t. Barun-Torey Lake, Russia).

The above list of opinions illustrates well the fact that taxonomy of *M. mystacinus* and present classification of individual populations are quite confused. Nevertheless, the population of boreal zone incl. the Central and the Northern Europe, and Northern Asia seems to be relatively homogenous in morphometrical respect and can be tentatively classified as belonging to the nominotypic subspecies *M. m. mystacinus*.

The disunity in evaluation concerns in particular "the southern" populations of *M. mystacinus* s. l., inhabiting the Southern Palearctics in the range from Balkans to China, so Turkey including. In agreement with experience of other students, Helversen (1989a, b) reports that in the territory of the Balkans and Turkey (and further to the east), there are still two other species, not yet distinguished from true *M. mystacinus*. So, the group should consist of three species: (a) a small-sized form with the forearm lenght up to 32 mm, with short and pale auricles and tragi that slighly exceed breaking of the posterior ear margin (tentatively coidentified with *M. ikonnikovi* or yet undescribed form), (b) a large form that Helversen (1989a) coidentified with the Central European *M. mystacinus*, and (c) a form temporary called *M. przewalskii*, that should be extremely well-built, with massive baculum, strongly reduced P^3 and P_3, and nonspecified differences in skull, chromosomes and ecology. Concerning the Turkish populations, Helversen (1989b) found that individuals of *M. "mystacinus" przewalskii* from the province of Erzurum have longer forearms (35–36 mm, n=6), than those from the Western Anatolia (32.5–34.5 mm, n=13). The name *M. przewalskii* and the name for the "new" species, Helversen (1989a) inferrs from an older study by Stubbe & Chotolchu (1968). They showed the variation of *M. mystacinus* in the whole areal of distribution, and suggested its taxonomic status, but they did not exclude the form *M. brandtii* as a species. It is important to note that the closest verified records of *M. ikonnikovi* come from the Western Altai Mts., the Eastern Kazakh-

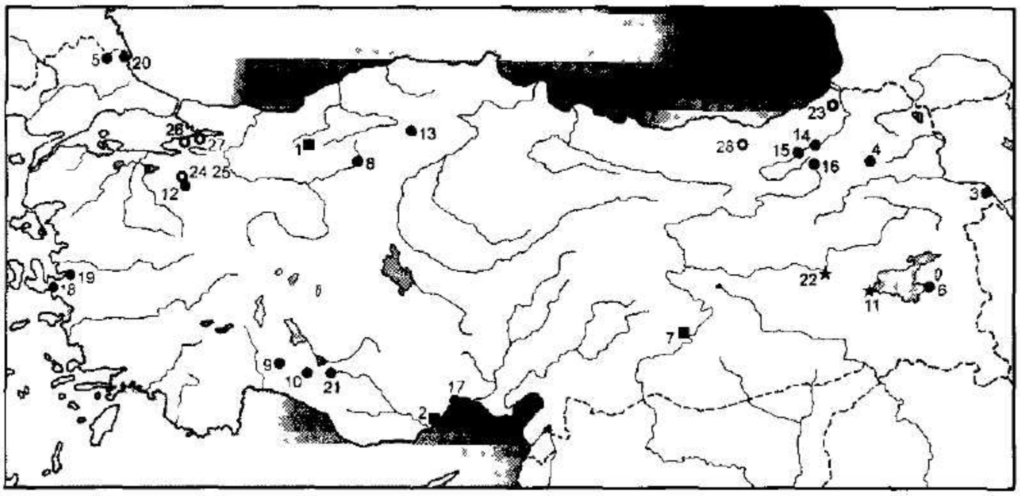

Fig. 15. Records of *Myotis mystacinus* in Turkey. For symbol explanations see Fig. 4, open symbols denote bat detector records of *Myotis* cf. *mystacinus* (see text)

stan (Strelkov & Šajmardanov 1983), i. e. from the area of sympatry with *M. mystacinus* and also *M. brandtii*. Anyhow, Strelkov (1983a) reported from the northern part of Caucasus Mts. finding of a bat corresponding in size with *M. ikonnikovi* (LCr 12.2 mm) from the Far East. Volleth (1987) with aid of NOR chromosome staining, distinguished two forms of *M. mystacinus*-group in the Balkans, differing from the Central-European population of *M. mystacinus* and *M. brandtii* in NORs localisation ("*Myotis* sp. A" and "*Myotis* sp. B")

There are two descriptions available from the Eastern Meditteranean: *M. mystacinus bulgaricus* Heinrich, 1936 (t. t.: E of Plovdiv, Bulgaria), now considered as a synonyme of the nominotypic subspecies (cf. Corbet 1978, Hanák 1965), and *M. mystacinus hajastanicus* Argyropulo, 1939 (t. t.: E of Sevan Lake, Armenia), the form, that has been, according to absolutely largest size, relatively long tail, and cranial characters, distinguished by Argyropulo (1939) from *M. m. brandtii*, *M. m. transcaspicus*, *M. m. kukunoriensis* and *M. m. przewalskii*. Hanák (1965) has considered *M. m. hajastanicus* as a valid subspecies, and besides the type series ranks there also the finding of Harrison (1963) from Gutur-Su (Northwestern Iran). Strelkov (1983a) who reexamined the type series considered the description of *M. m. hajastanicus* as incorrect, but he has not provided a conclusion on the status of the population from the Lesser Caucasus Mts. and the Armenian Highlands. Albayrak (1991) who studied Turkish populations of *M. mystacinus*, and compared them with literary data (i. e., Hanák 1970, Gauckler & Kraus 1970), has claimed the nominotypic subspecies does not occur in the territory of Turkey and atributed all his records to *M. m. hajastanicus* (refusing the opinion on its synonymy with *M. m. mystacinus* by Gauckler & Kraus 1970).

In conclusions, a question of phyletic diversification and actual content of *M. mystacinus*-group is among the most complicated tasks of contemporary chiropteran systematics. *M. mystacinus*-like bats represent one of the target phenotypes into which phylogenetic divergence of vespertilionid bats tends to canalize. There is an extremely large variation in frame of this principaly generalized phenotype. It may include as well a temporary divergence of local populations, a cline variation as it may result of a parallel variation in supposedly quite a distant lineages. To distinguish in each region and each sample which kind of variation does here play a role is almost beyond scope of standard morphometric techniques. The topics call for a profound revision of all available material in the Palearctic range (including type material of all taxa named within this group) using a combined application of both the traditional and new taxonomic approaches. In any case, for the moment, it seems clear that just in the territory of Turkey at least three different forms do occur. Which is their actual status and actual distribution pattern remains a task of further study.

Myotis brandtii (Eversmann, 1845)

RECORDS **Literary data** Rize Çamlıhemşin, Çatköy [1], 27 August 1967 4ms, 3fs, 11 July 1980 1ms, 1fs (Albayrak 1990, 1991), – Çat (S of Çamlıhemşin) [1], house, 6 August 1967 3f, 10 August 1967 5f, 2 Sept 1967 1m (Steiner & Gaisler 1994, cf Peus 1976); – Hemşin (= Ortakoy), by Çaglar (1969) mentioned as *M mystacinus*, but reexamined by Steiner & Gaisler (1994) (under locality Çamlıhemşin); – Meydan (S of Çamlıhemşin) [2], pile of logs (in forest), 7 Sept 1968, 1fj (Steiner & Gaisler 1994).

DISTRIBUTIONAL STATUS (Fig. 16). All Turkish records of *M. brandtii* come from one restricted area in the Easternmost Pontus, and most probably belong to an isolated population inhabiting also Caucasus Mts. and Transcaucasia (Strelkov et al. 1978, Strelkov 1983a, Ilyin et al. 1998). In the Eastern Turkey, the occurrence of *M. brandtii* has been expected already by Kumerloeve (1975). The other area where it may possibly occur is the mountain part of Thrace (Istranca Mts.) neighbouring the Bulgarian mountains where this species has been already found (Horáček et al. 1974, Ivanova 1998, Pandurska & Beshkov 1998). The question whether these two populations are interconnected through the Pontic mountains remains still open, of course.

TAXONOMIC STATUS. Geographic variation in the East-European and the Asian parts of distribution range of *Myotis brandtii* has been revised by Strelkov (1983). He reported two subspecies: *M brandtii gracilis* Ognev, 1927 (terra typica: Vladivostok, Russian Far East), that occurs in Far East and the Eastern Siberia, and *M. b. brandtii* (Eversmann, 1845) (t. t.: Spassk, Southern Ural Mts., Russia) inhabiting the rest of the distribution range, with exception of a supposedly isolated population in Caucasus Mts. and Transcaucasia (i. e. incl. the Eastern Turkey), which taxonomic status Strelkov (1983a) kept as unclear. Turkish material coming from one and the same locality was studied by Albayrak (1991) and Steiner & Gaisler (1994) who found no esential differences from the morphometrical diagnosis of the species as understood based on the European samples.

Myotis daubentonii (Kuhl, 1817)

RECORDS **Original data** Bolu Abant Gölü [1], S bank of the lake, 13 June 1998 det min. 5 ind – **Kırklareli** Igneada, Longoz [2], a stream in woodland, 9 May 1992, net, 3 ind (leg Reiter, Andreas & Sádlová), 23 June 1994 net 1m, 1f, CUP, – Sarpdere, Dupnisa magarası cave [3], 16 Oct 1993 net 2m, 1f, CUP, – Velika Köprusu bridge (8 km SW of Demirkoy) [4], 5 May 1992, net, 2 ind (leg Reiter, Andreas & Sádlová), 30 August 1996 net 2ms, NMP (spec Nos 47944, 47945) – **Literary data** Bolu 10 km W of Mudurnu (= "Mudurnu yolu") [5], 1 Sept. 1986 5ms, 1fs (Albayrak 1988, 1993) – Bursa. Çaybaşı (S of Uludag Mts) [6], Nilufer Çayı creek, 22 July 1983·3m (Helversen 1989b) – Samsun Tozkoy (20 km S of Bafra) [7], small river, 30 July 1983 3m (Helversen 1989b). – Turkey (no exact loc.) (Theodor 1967).

DISTRIBUTIONAL STATUS (Fig. 16). An occurrence of *M. daubentonii* in Thrace and Western Pontus evidently extends its Balkan range. There is no evidence of this species in Caucasus Mts. and Transcaucasia. In the Northwestern Turkey, this species reaches the southernmost margin of its distributional range in the Eastern Mediterranean (viz. Bogdanowicz 1994, Mitchell-Jones et al. in press).

TAXONOMIC STATUS. Corbet (1978) reported the nominotypic subspecies *M. daubentonii daubentonii* (Kuhl, 1817) (terra typica: Hanau, Germany) only from the whole range of distribution. Hanák &

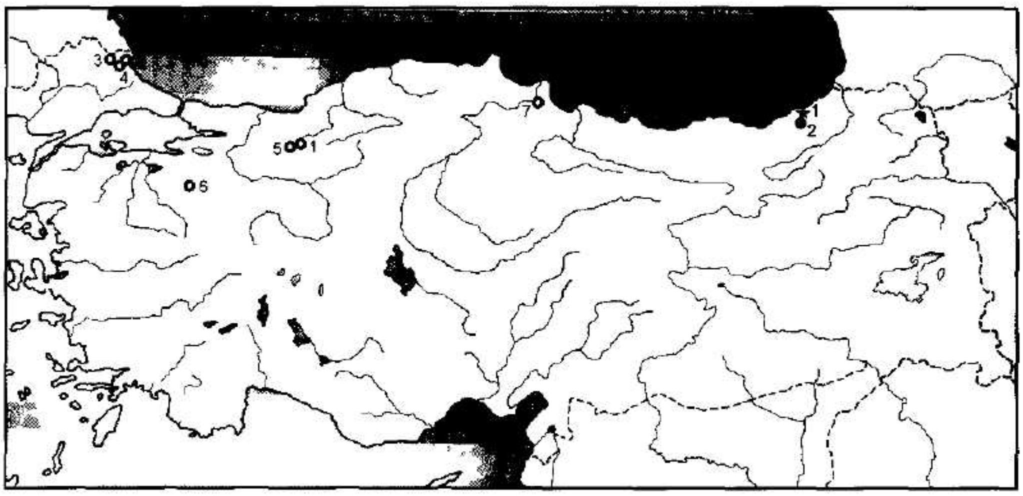

Fig. 16 Records of *Myotis brandtii* (closed symbols) and *M. daubentonii* (open symbols) in Turkey. For symbol explanations see Fig. 4

Horáček (1984) proposed three well (in metrical characters) defined subspecies inhabiting the Western Palearctics: *M. d. nathalinae* Tupinier, 1977 (t. t.: Cabezzarrubias, Spain) for the Iberian peninsula, *M. d. daubentonii* for the Central Europe and *M. d. volgensis* (Eversmann, 1840) (t. t.: Ural Mts., Russia) in the Eastern Europe and Siberia. However, they did not mention the Balkan and Ciscaucasian populations (the Turkish samples were not evaluated). Albayrak (1988), who first reported this species for Turkey, claimed that in size his specimens are smaller in comparison with data by Hanák & Horáček (1984). Also Helversen (1989b) noticed the differences, he reported, that the specimens from Uludag Mts are smaller and more reddish than those from Samsun province where the bats are bigger and dark brown-grey (the similar observation he reported also for Greece: bats in the Prespa Lake are bigger than those from Chalkidiki peninsula). Bogdanowicz (1990, 1994), based on taxonomical comparison of the material from whole Europe, arranged both the Siberian and European populations to the nominotypic subspecies. He also stated cline shift of metrical characters in agreement with the Bergmann's rule, just with the exception of the marginal southernmost populations (Southern Portugal and Macedonia). Thus, the geographic variation in *M. daubentonii* can be characterised by cline increase in size either from the west to the east, and from the south to the north. It is still an open question, however, whether the specificity of the southernmost population in the Eastern Mediterranean (i. e. those from Turkey) are indeed so large that would be worth of a nomenclatoric separation at the level of subspecies.

Myotis capaccinii (Bonaparte, 1837)

RECORDS **Original data** Antalya Sahil [1], 26 April 1992 net 1f, CUP (leg Hanak) Bolu: Çepni [2], travertine, remains of 1 ind in a pellet of *Bubo bubo* – Içel Bozagaç [3], Yalan Dünya magarası cave, 30 Oct. 1993 net 1f, CUP Istanbul Yalova Termal [4], over a brook below a dam, 24 June 1990 det 2 ind – Kırklareli Igneada, Longoz, a stream in woodland [5], 23 June 1994 det 1 ind., – Igneada, Longoz [6], Bezergan magarası cave, 9 May 1992 obs 3 ind (leg Reiter, Andreas & Sadlová), 22 June 1994 net 1m, CUP, – *Sarpdere, Dupnisa magarası cave [7], 16 Oct 1993 net 1m, 5f, CUP, Summer 1995, PMSL (leg Kryštufek)* – **Literary data** Antalya Kaş [8], 10 June 1966, 6 ind (Kock 1974); Manavgat [9], ancient aquaeduct, 13

April 1987 5 ind (Helversen 1989b) – Aydin Sultanhısar [10], ancient Nyssa, 5 May 1985: 1f (Helversen 1989b) – Balıkesir Koyunkaya (n Manyas) [11], cave, 26 Sept 1960 1m (Çaglar 1961b, 1965, 1969) – Burdur Insuyu magarası cave [12], 11 April 1966 75 ind, 24 Febr and 24 June 1969 8 ind (Kock 1974), 8 July 1987 4m, 2f (Albayrak 1990a, 1993) – Bursa river SE of Inegol [13], 20 July 1987 1m (Helversen 1989b) – Edirne: Ibrice (n Keşan) [14], cave, 4 August 1987 1m, 2fa, 3fs (Crucitti 1988) – Hatay Antakya [15], 20 Febr. 1960 1 ind. (Kahmann & Çaglar 1960), – Habibinecar dagı (n. Antakya) [16], aquaeductus, 16 Febr 1960 3m, 1f (Çaglar 1961b, 1965), – Harbiye (n Antakya) [17], cave, 23 Febr 1960 1m, 26 May 1960 1m (Çaglar 1961b, 1965), – Narlıca koyu village [18], cave, 16 23 Febr 1960. 4m, 5f (Kahmann & Çaglar 1960, Çaglar 1961b. 1965, 1969, Kock 1974), Karalık magarası cave, 12 Nov 1979 7m, 1f (Albayrak 1990, 1990a) – Içel n Tarsus [19], 23 July 1959 (Osborn 1963), Tasucu (n Silifke) [20], cave, 11 Febr 1961 1m (Çaglar 1961b, 1965, 1969) – Istanbul Kuçukçekmece [21] (Çaglar 1969), Halkalı cave, 15May 1971 12f (DeBlase & Martin 1973), – Şile, Sofular koyu village [22], cave, 30 Sept 1987 4m, 2f (Albayrak 1990a, 1993), – Yarımburgaz [23], cave, 31 July 1960 1m, 2f (Çaglar 1961b, 1965) – Izmir Bergama [24], 8 June 1977 22 ind (Kock 1989), Bergama, ruins (Kahmann 1962) – Kırklareli 5 km W of Igneada [25], 13 May 1967 (Hůrka 1972), – Demirkoy [26], cave, 17 July 1961 1f (Çaglar 1965, 1969), 10 May 1967 (Hůrka 1972) Konya Uçpınar (SW of Bozkır) [27], 27 June 1986 8m, 3f (Helversen 1989b)

DISTRIBUTIONAL STATUS (Fig. 17). *M. capaccinii* is known only from the coastal areas of the Western and the Southern Turkey. The Turkish records delimit the eastern margin of the distribution range of this species, which continues to the south through the Levant into the Southeastern Mesopotamia and the Southern Iran (DeBlase 1980, Harrison & Bates 1991).

TAXONOMIC STATUS. Kumerloeve (1975) supposed that subspecies *M. capaccinii bureschi* (Heinrich, 1936) (terra typica: Karamlek, Stranja [= Istranca] Mts., Bulgaria) occured in Thrace. Except for Corbet (1978) who doubted its validity and reported the nominotypic subspecies *M c capaccinii* (Bonaparte, 1837) (t. t.: Sicily, Italy) only, many authors (DeBlase 1980, Harrison & Bates 1991, Koopman 1994) accepted the Kumerloeve's conclusion that the Turkish range is inhabited by subspecies *M. c. bureschi*. The Turkish sample was factually evaluated by Albayrak (1990a) who considered Turkish populations to belong to the subspecies *M. c capaccinii* (although he supposed that populations from Israel and Iran differ from the others in some cranial characters).

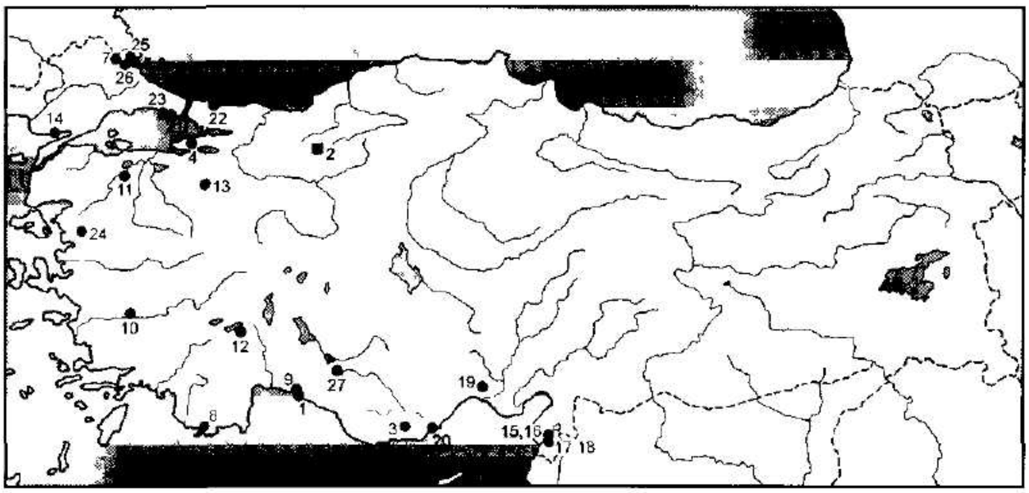

Fig 17 Records of *Myotis capaccinii* in Turkey. For symbol explanations see Fig 4

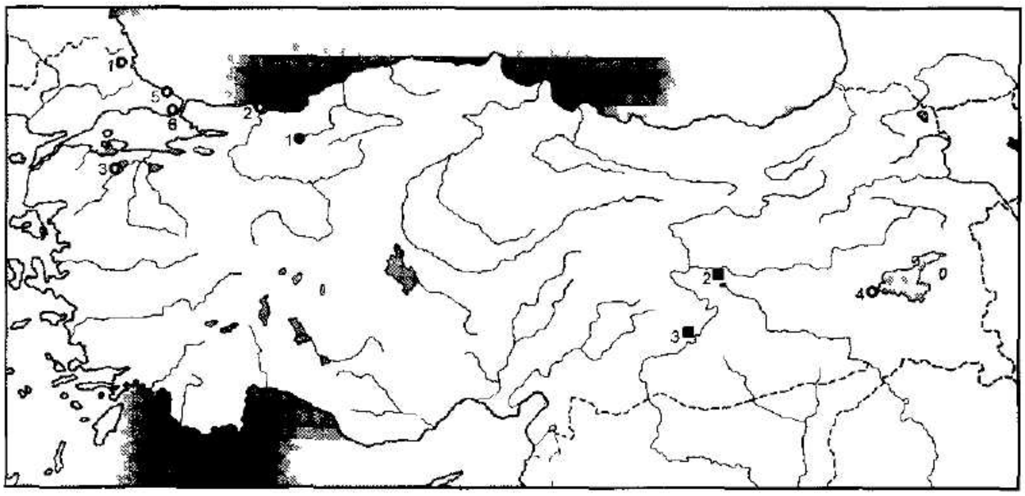

Fig 18 Records of *Vespertilio murinus* (closed symbols) and *Pipistrellus nathusii* (open symbols) in Turkey For symbol explanations see Fig 4

Vespertilio murinus Linnaeus, 1758

RECORDS **Original data** Bolu Abant Golu lake [1], 24 June 1994 det 1 ind, 26 June 1994 det 1 ind – Elazıg Harput [2], Buzluk magarası cave 27 Oct 1993 1 ind in a subfossil deposit – **Literary datum** Adıyaman Karadut [3] cave, 7 June 1992 1 ind (from owl's pellets) (Obuch 1994)

DISTRIBUTIONAL STATUS (Fig 18) There are only three findings of *V murinus* in Turkey They make the southern margin of its distribution range in the Eastern Mediterranean Strelkov (1997a, b) has supposed that Mediterranean does not belong to the range of reproduction of *V murinus* (i e region of nursery colonies) but to the area of seasonal migrations only

TAXONOMIC STATUS Corbet (1978) reported nominotypic subspecies *V m murinus* Linnaeus, 1758 (terra typica Sweden) for the areal from Europe to the Amur region Many other authors (DeBlase 1980, Koopman 1994, Strelkov et al 1978) consent to this statement

Eptesicus serotinus (Schreber, 1774)

RECORDS **Original data** Ankara Kurutlutepe [1], shore of Tuz Golu lake, 13 June 1998 remains of 1 ind in pellets of cf *Bubo bubo* (leg Obuch) – Artvin Murgul [2], Damar in the village, 3 Sept 1995 det min 1 ind – Bolu environs of the town (Thermal) [3], 12 June 1990 det min 1 ind Çorum Hattuşaş [4] 22 April 1996 remain of 1 ind in pellets of cf *Strix aluco* (leg Obuch) Edirne Edirne [5], town, 28 Oct 1994 det 2–3 ind – Elazıg Harput [6], Buzluk magarası cave, 27 Oct 1993 net 1 ind, CUP – Eskişehir a rocky massif 10 km NE Sıvrihisar [7], 4 July 1994 det 1 2 ind – Içel Narlıkuyu [8], 29 Oct 1993 remain of 1 ind in pellets of cf *Strix aluco* – Istanbul Yalova [9], a town outskirts, 21 June 1990 det min 1 ind – Kars Ani [10], ruins of Armenian town, 20 May 1997 obs 1 ind in a wall fissure, Кагызман (= Kagizman) [11], 1896 2m 1f, ZIN (spec Nos 4876–4878, leg Satunin) – Kayseri Yeşilhisar [12], 3 km NW Akkoy Summer 1995, PMSL (leg Kryštufek) – Sinop a village between Yalıkoy and Kabalı [13], 22 Oct 1993 det min 1 ind – Sivas Gucuk (n Sarkışla) [14], Summer 1995, PMSL (leg Krystufek) – Zonguldak 10 km SW Karabuk [15], 1 July 1994 det swarming of a colony, Yenice [16], in the village, 1 July 1994 det 1 ind – no exact loc Turkish-Persian border, 20 April 1914 1f, ZIN (spec No 48507, leg Nesterov) **Literary data** Adana Kadırlı [17], small colony, coll 2 ind (Albayrak 1993) Adıyaman Karadut [18], cave 7 June 1992 2 ind (from owl's pellets) (Obuch 1994) – Ankara Şerefli Koçhisar [19], arid valley, 28 June 1986 det (Helversen

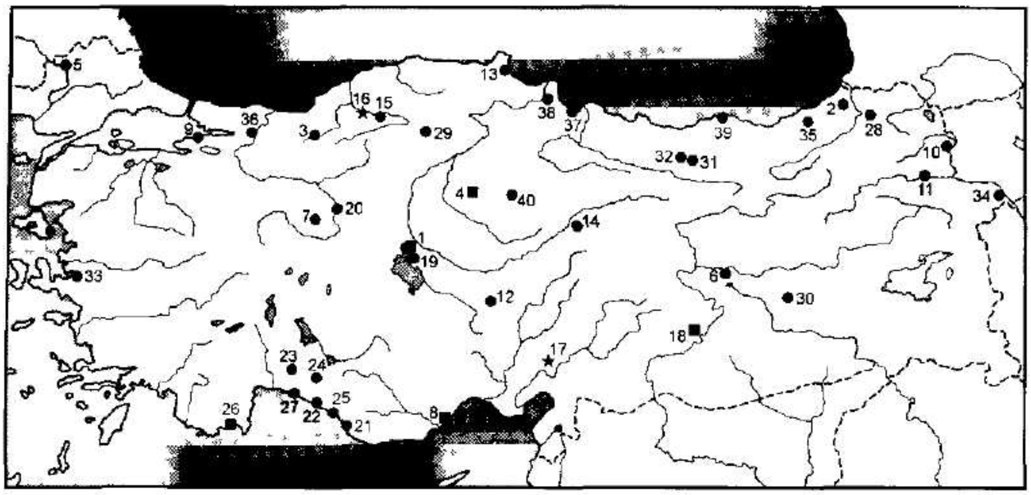

Fig 19. Records of *Eptesicus serotinus* in Turkey. For symbol explanations see Fig. 4.

1989b), – Yassıhöyük (= Gordion) [20], 25 July 1983 det (Helversen 1989b) – Antalya 9 km NW of Gazipaşa [21], obs (Spitzenberger 1994), Alara hanı [22], 16 August 1986 obs group of ca 50 ind , 4 single ind , 4 couple of ind , group of 3 and 8 ind (coll 2m, 7f) (Spitzenberger 1994), – Beşkonak [23], 30 June 1986 2f (Helversen 1989b), – bridge over Manavgat river (n Ibradı) [24], 28 June 1986 det. (Helversen 1989b), – Castle of Alanya [25], obs (Spitzenberger 1994), – Finike [26], Cliff cave, summer 1965 1 maxilla (Corbet & Morris 1967), – Side [27], amphitheatre, 30 June 1986 1m (Helversen 1989b) – Artvin gorge below Ardanuç [28], 12 August 1983 1fj (Helversen 1989b) – Çankırı Devrez Çayı creek (n Ilgaz) [29], 15 August 1983 5f (Helversen 1989b) – Diyarbakır Bırklın magaraları cave (n Lice) [30], 27 July 1984 1 ind juv (Spitzenberger 1994) – Giresun Kemaliye Koyu village [31], schoolhouse, 10 ind (Albayrak 1990), – mountain forest betw Kumbet and Tamdere [32], 1 August 1983 det (Helversen 1989b) – Izmir Izmir (no exact loc) [33] (Çaglar 1965) – Kars Aralych-Bezirk (= vicinity of Aralık) [34] (Satunin 1913), "das Plateau von Kars" (Satunin 1913) – Rize Şenyuva (S of Çamlıhemsin) [35], house, 24 August 1967 1m (Steiner & Gaisler 1994) – Sakarya Istanbuldere köyu village (n. Adapazarı) [36], behind the window, 15 August 1963 1f (Çaglar 1965, 1969) – Samsun Karadeniz Pest Control Research Institute [37], 4 ind (Albayrak 1990), – Tozkoy (20 km S of Bafra) [38], 30 July 1983 1mj, 1f (Helversen 1989b) – Trabzon Vakfikebir [39], Beşikduzu bucagı, Takazlı Koyu village, 14 ind (Albayrak 1990) – Yozgat Issa-fakır [40], 1m, 1f (Danford & Alston 1877) = Isar-Fakır (Dobson 1878) = Isafakır (Çaglar 1965) = Isakfakır (Spitzenberger 1994)

DISTRIBUTIONAL STATUS (Fig. 19). Altogether 40 records of *E serotinus* cover, similarly as in some of above mention species (i. e. *R hipposideros*, *M blythii*), almost the whole area of Turkey, i. e. all biogeographic units, except for the region of Mesopotamian steppes (Tab. 1).

TAXONOMIC STATUS. According to Corbet (1978) whole Europe up to Caucasus Mts is inhabited by the nominotypic subspecies *E serotinus serotinus* (Schreber, 1774) (terra typica: France), the Southwestern Iran by *E. s. shiraziensis* (Dobson, 1871) (t t.: Shiraz, Iran), Kopetdag Mts and Central Asia by *E. s. turcomanus* (Eversmann, 1840) (t. t.: between Caspian and Aral Lakes), and some other forms occur in Afghanistan and in the eastern part of the range (*E. s. pachyomus* (Tomes, 1857), *E. s. pashtonus* Gaisler, 1970, etc.). Strelkov et al. (1978) have reported *E s. serotinus* from higher altitudes of the Western and Central Kopetdag Mts. and *E s. turcomanus* from the Eastern Kopetdag Mts. and deserts north of it. Gaisler (1970), Harrison & Bates (1991) and Koopman (1994) consider territory of Asia Minor as part of the range of *E. s. serotinus*. DeBlase (1980) arranged the samples from Transcaucasia and Kurdistan up to the Kopetdag Mts. to *E. s. serotinus*, while that from the Southern Zagros Mts. to *E. s. shiraziensis*. Steiner & Gaisler (1994) did not find any differences between the East-Turkish sample and *E. s. serotinus* from Central Europe.

A detailed analysis of the Turkish material of *E. serotinus* was undertaken by Spitzenberger (1994) She has assumed that nominotypic subspecies is dispersed from Europe (incl. the Balkans), through the Pontic Mts., Transcaucasia and the Southern Caspian coast up to Kopetdag Mts. In contrast, her samples from the Southern Anatolia differed at a subspecific level (exhibiting the same colouration as *E s. turcomanus*, and the same size as *E. s shiraziensis*) though their subspecific status was not formally specified because of scarcity of prerequisite comparative material.

Consequently, it seem possible to conclude that territory of Turkey may is a zone of transition between two forms differing at a subspecific level, i. e. *E. s. serotinus* (Northern Turkey), and the southern one, that can be tentatively coindetified with *E. s shiraziensis*.

Eptesicus bottae (Peters, 1869)

RECORDS. **Original data** Içel Bozagaç [1], Yalan Dunya magarası cave, 30 Oct 1993 net 1m, CUP, – Narlıkuyu [2], 29 Oct 1993 remain of 2 ind in pellets of cf *Strix aluco*, – Narlıkuyu, Cennet cave [3], 4 August 1992 net 1m, NMP (spec No 47925) – **Literary data** Adana Toprakkale [4], 5 August 1976 1m, 1fs (Nader & Kock 1990) Adıyaman Karadut [5], cave, 7 June 1992 11 ind (from owl's pellets) (Obuch 1994) – Antalya Alanya [6], 21 May 1966 1f (Felten 1971). – Belkıs koyu village [7], 30 July 1984 4m, 16f (Spitzenberger 1994); – Myra (n Kale) [8], 13 August 1986 1m, 1f (Spitzenberger 1994), – Olimpos (n Kumluca) [9], 31 July 1984 1m (Spitzenberger 1994) – Içel· 5 km SW of Tasucu [10], 18 August 1986 2f (Spitzenberger 1994), – Anamur [11], old fort of castle, 3 Sept 1975 1fa (Nader & Kock 1983), – Anamurium (n Anamur) [12], 17 August 1986 1m, 1f (Spitzenberger 1994), – Castle of Mamure (5 km SE of Anamur) [13], 17 August 1986 1f (Spitzenberger 1994), – Castle of Tokmar (11 km SW of Bogsak) [14], 18 August 1986 1f (Spitzenberger 1994), Silifke [15], 19 August 1986 1m, 1f (Spitzenberger 1994) – Izmir Efes [16], 2 August *1984 and 6 August 1986 5m, 13f (Spitzenberger 1994), – Selcuk [17], 5 August 1986 2m (Spitzenberger 1994)* – Manisa Sartmustafa [18], Sardes, 1m, 1f (Spitzenberger 1994)

DISTRIBUTIONAL STATUS (Fig. 20) *E. bottae* has been recorded only in the southern part of Asia Minor (*E bottae anatolicus*). There may be a continual extension of its range to the south (al-

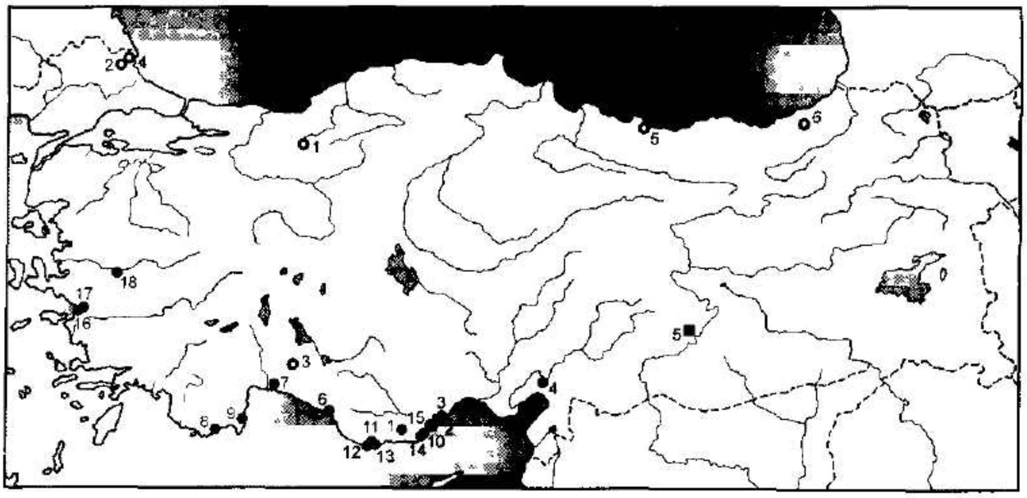

Fig 20 Records of *Eptesicus bottae* (closed symbols) and *Nyctalus leisleri* (open symbols) in Turkey For symbol explanations see Fig 4

though no Syrian records is available as yet) to the Northern Iraq (Harrison 1956) and the Persian Zagros Mts. (DeBlase 1980, own data), and it was found also in Greek island of Rhodes (Spitzenberger in litt.). Of course, this species (*E. bottae ognevi*) is also known from Transcaucasia (Georgia, Azerbaijan) and Persian Azerbaijan (DeBlase 1980, Hanák & Gaisler 1971, Nader & Kock 1990); from Nakhichevan (Naxçıvan) where it was found even in the Araxes River valley, just bordering the Nortwestern Turkey. Thus, appearence of an other population in the Armenian Highlands and the Eastern Pontus, *E. bottae ognevi*, can be more than expected (cf. Koopman 1994).

Taxonomic status. The first record of *E. bottae* from Turkey was obtained by Felten (1971) in Alanya (Antalya Province). He described it as a new species *E anatolicus* Felten, 1971, and distinguished it from *E. bottae hingstoni* Thomas, 1919 (terra typica: Baghdad, Iraq) according to metrical characters. This become the only description of a bat species from today Turkish territory. Harrison (1975) reexamined the Arabian material of *E bottae*, and included Felten's description in *E. bottae*, as an independent subspecies *E. bottae anatolicus* Felten, 1971. This solution was confirmed by many other authors (Corbet 1978, DeBlase 1980, Harrison & Bates 1991, Nader & Kock 1990, Spitzenberger 1994).

Hanák & Gaisler (1971) arranged originally independent species *E. ognevi* (Bobrinskii, 1918) (t. t.: Bukhara, Uzbekistan) under *E. bottae* which have been accepted also by Nader & Kock (1990) and Koopman (1993, 1994).

Hypsugo savii (Bonaparte, 1837)

Records **Original data** Elazıg Harput [1], Buzluk magarası cave, 27 Oct 1993 net 1m, CUP – Erzurum 10 km SW of Aydogdu [2], canyon, 9 Sept. 1995: det min 1 ind – Eskişehir a rocky massiff 10 km NE Sivrihisar [3], 4 July 1994 det 1–2 ind – Içel. Bozagaç [4], Yalan Dunya magarası cave, 30 Oct 1993 net 1m, CUP – Şanlı Urfa: Birecik [5], 15 July 1996 1fj, found dead in rocks, CUP (leg Vořišek). – Trabzon Sumelas [6], 25 Oct 1993 det min 1 ind – Van Castle of Van [7], 28 July 1992 net 2m, NMP (spec No 47909, 47910). – Muradiye, Seytan Koprusu cave [8], 27 July 1992: net 1m, NMP (spec No 47904) – Zonguldak Safranbolu [9], Mencilar (= Mencilis) magarası cave, 4 July 1994 det 5–10 ind – **Literary data** Adıyaman Karadut [10], cave, 7 June 1992 1 ind (from owl's pellets) (Obuch 1994) – Ankara Ankara [11], building of Faculty of Science, Ankara University, 2 ind (Albayrak 1993); – Ankara, four lokalities (one S of Ankara) [12] (Albayrak 1985, Helversen 1989b); – Yassıhoyuk (= Gordion) [13], 25 July 1983. 2m, 2f (Helversen 1989b) – Antalya Beşkonak [14], Kopru Irmagı river, 10 Oct. 1984 1f, 30 June 1986 2m, 1f (Helversen 1989b). – Artvin. Ardanuç [15], river in gorge, 12 August 1983: 1m (Helversen 1989b) – Bursa river SE of Inegol [16], 20 July 1987 1m (Helversen 1989b). – Hatay Belen [17], above the Topbogazı Gecidi pass, 9 June 1992 1 ind (from owl's pellets) (Obuch 1994). – Içel n Tarsus [18], 23 July 1959 (Osborn 1963). – Van Castle of Van [7], 1 ind (Albayrak 1990).

Distributional status (Fig. 21). Although actual record in Turkey is far not rich, in analogy with neighbouring regions it seem possible to expect that *H. savii* inhabits probably almost the whole territory of Turkey. Surprisingly, this species has not been found on the Aegean coast of Asia Minor and in Thrace though, according to the findings from the Balkan peninsula (see Mitchell-Jones et al. in press), it seems to be very common in all neighbouring areas, including the islands. Incidentally, this species was also very rarely recorded in Iran (DeBlase 1980).

Taxonomic status. Corbet (1978) showed the form *H. savii savii* (Bonaparte, 1837) (terra typica: Pisa, Italy) in Europe and the Northern Africa, *H. s. caucasicus* (Satunin, 1901) (t. t.: Tbilisi, Georgia) in Caucasus Mts. up to the Western China. Harrison (1964) reported the form *H. s. caucasicus* for the Arabian part of range of distribution (and the Southern Turkey). Similar identification was proposed also for a sample from Tarsus Mts. by Kumerloeve (1975) and for other regions of the Southwestern Asia by many other authors (Bekenov et al. 1985, DeBlase 1980, Harrison & Bates 1991, Strelkov et al 1978).

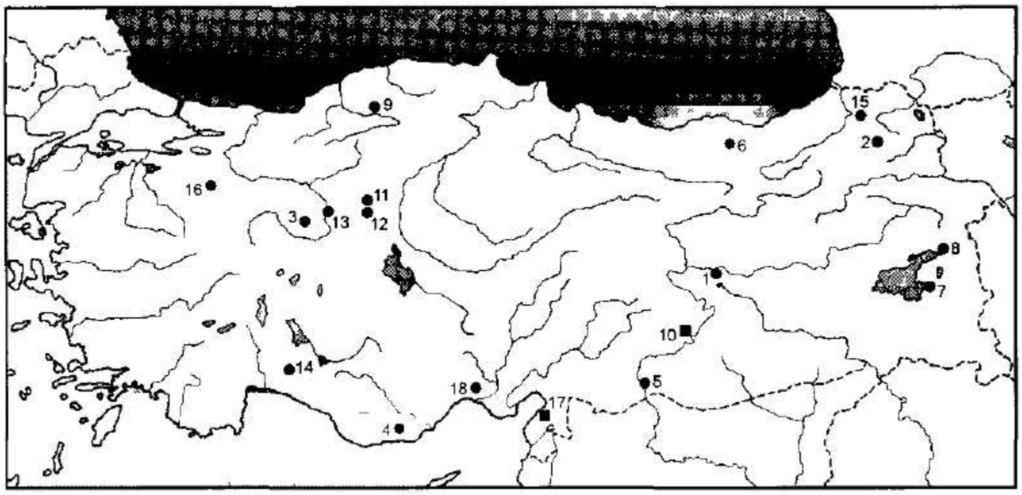

Fig 21 Records of *Hypsugo savii* in Turkey For symbol explanations see Fig 4

Horáček & Hanák (1986), who revised the material from the whole range of distribution, stated that the form *H. s caucasicus* is distributed from Crimea, Turkey, Cyprus and Lebanon to Central Asia, while Europe, incl. the Balkans, is inhabited by *H. s savii*. In contrast to Corbet (1978), they respected subspecific status of the Spanish and the North-African populations, *H. s. ochromixtus* (Cabrera, 1904) (t. t.: Madrid, Spain). Helversen (1989) noticed in more detail the colouration of the Turkish population: in Anatolia there are individuals with "sandy-golden back with long silky fur contrasting with black ears and muzzle", similary as in populations in the Aegean islands what contrasts with the dark individuals from the Greek mainland. These findings could correspond with the geographic separation suggested by Horáček & Hanák (1986). Anyhow, *H savii* is extremely variegate in colouration (Dulić 1978) and taxonomical meaning of that character was doubted also by Arlettaz et al. (1993). Nevertheless, the mean population state of that character undoubtedly shows a considerable geographic differences and it is worth to be taken in account.

Pipistrellus pipistrellus **(Schreber, 1774)**

RECORDS **Original data** Antalya Kınık (n Kaş) [1], 25 April 1992. net 1f, CUP (leg Hanak) – Artvin Murgul [2], Damar, in the village, 3 Sept 1995 det. min 1 ind – Bolu Abant Golu lake [3], 24–26 June 1994. det 3 5 ind – Bursa Uludag [4], 1450 m, 29 July 1994 det 1 ind – Edirne Edirne [5], old serail, 30 Oct 1994 det min 8 ind, Selimiye Camii mosque, 28 Oct 1994 det min 10 ind – Içel. Narlıkuyu [6], 29 Oct 1993 remain of 3 ind in pellets of cf *Strix aluco* – Istanbul Istanbul, near hippodrome [7], 25 June 1990 det 5 ind., - Simila [8], a village n. Yalova, 24 June 1990 det 1 ind, Yalova [9], a town outskirts, 21 June 1990 det min 1 ind, – Yalova Termal [10], over a brook below a dam, 24 June 1990 det min 1 ind – Izmir Bergama [11], in the town, 3 Nov 1993 det min 1 ind – Kars Tuzluca [12], salt pit. 20 May 1997 remain of 1 ind in a pellet of cf *Strix aluco* (leg Obuch) – Kırklareli Velika Koprüsu bridge (8 km SW of Demirköy) [13], 5 May 1992. net. 1 ind (leg Reiter, Andreas & Sadlova), 30 August 1996 net 1ms, 1fs, NMP (spec Nos 47946, 47947) – Kocaeli Altinova [14], town outskirts, 23 June 1990 det min 1 ind, - Fevziye (4 km S of Altinova) [15], 23 June 1990 det min 1 ind – Nevşehir Goreme [16], cave 500 NE, 26 July 1996 net 1 ind. (leg Munclinger), 27 July 1996 net 1fa (leg Munclinger) – Sakarya Denizkoy [17], solitary house, 6 April 1992 1m (leg Zukal) Sinop a village between Yalıkoy and Kabalı [18], 22 Oct 1993 det min 1 ind
Literary data Adana Harunıye [19], 1953 (Kumerloeve 1975), – Karaisalı [20], Baskıf koyu village, 3 ind

(Albayrak 1993) – Karataş [21], Spring 1987 15–20 ind obs (van Winden 1988), – Tuzla [22], brick wall of the tearoom, 18 May 1987 obs colony min 99 ind (van Winden 1988) – Adıyaman Karadut [23], cave, 7 June 1992 2 ind (from owl's pellets) (Obuch 1994) – Ankara Ankara [24], building of Faculty of Science, Ankara University, 3 ind (Albayrak 1993), Ankara, a house 24 August 1953 1m (DeBlase & Martin 1973) – Çankaya [25], 23 Sept 1978 2fa (Albayrak 1987), – S of Kızılcahamam [26], det (Helversen 1989b), - Yassıhoyuk [27], det (Helversen 1989b) – Antalya Beşkonak [28], 30 June 1986 1faP (Helversen 1989b), – Demre (= Kale) [29], det (Helversen 1989b), – Serik [30] cave, 7 Febr 1960 2f (Çaglar 1965, 1969), – Yalnız [31], house, sum 1965 obs colony (coll 2 ind) (Corbet & Morris 1967, cf Neuhauser & DeBlase 1971) – Artvin Artvin [32], Genya hotel, 16 July 1979 13mj, 22fa, 14fj (Albayrak 1987, 1990) – Aydın Kuşadası [33], 13 June 1985 12fa (Albayrak 1987 1993) – Balıkesir Dinkçiler dist [34], 18 June 1977 1ma, 1fa (Albayrak 1987, 1993) – Bursa Iznik [35] Elbeyli koyu village, 5 ind (Albayrak 1993), – Nilufer Çayı creek (S of the Uludag) [36] det (Helversen 1989b) – Uludag [4], det (Helversen 1989b) – Çanakkale Gelibolu [37], building, 30 July 1962 1fj (Çaglar 1965, 1969), – Gokçeada I [38], Suurunleri building, 12 Sept 1983 3ma, 1fa (Albayrak 1987 1993) – Çankırı Çankırı (no exact loc) [39] (Çaglar 1965) – Denizli Baskarcı [40], behind the window, 5 May 1962 30f (Çaglar 1965, 1969) – Hatay Bedirge (= Serinyol) [41], 23 April 1965 3f, 28 April 1965 1f (Lehmann 1966) – Narlıca magarası cave [42] (Şadoglu 1953), – vicinity of Antakya [43], 1953 1m (mummy) (Lehmann 1966) – Içel Kulakkoy village [44], Spring 1987 10–15 ind obs (van Winden 1988) – Isparta Pazarkoy [45], 27 May 1966 8 ind (Kock 1974) – Istanbul Bebek [46] house 12 May 1959 1 ind (Osborn 1963), – Incegiz (n Çatalca) [47], cave, 29 nov 1959 1f (Çaglar 1965 1969) – Tuzla [48], 20 Jan 1964 1m (Çaglar 1965, 1969) – Vanikoy [*49*], building, 6 Sept 1962 1m (Çaglar 1965, 1969), – Vezneciler [*50*], building 22 Nov 1963 1m (Çaglar 1965, 1969) – Zekeriya koyu village [*51*], 1963 1m, 2f (Çaglar 1965, 1969) Izmir Balıkıosa (=? Balıklıova) [52], 23 April 1969 (Peus 1976), – Izmir (no exact loc) [53] (Çaglar 1965), – Çeşme [54] Alacatı, Pazaryeri mosque, 25 August 1984 6fa (Albayrak 1987, 1993), – n Foça [55], det (Helversen 1989b) – Kars Aralık [56] (n Igdır), D U Ç (= state farm), 25 August 1968 1fa (Albayrak 1987) – Kastamonu Araç [57], 18 August 1984 10fa (Albayrak 1987), Forest directory building, 22 ind (Albayrak 1993) – Kırklareli Alpullu [58], 8 July 1985 1ma, 4fa (Albayrak 1987, 1993), – Pınarhısar [59], tree hollow, 5 August 1963 1m (Çaglar 1965, 1969) – Konya n Bozkır [60], det (Helversen 1989b) - Manisa Muradiye [61], Ataturk school 14 June 1985 10fa (Albayrak 1987, 1993) – Mugla Dalyan [62], Ortaca, 26 May 1985 30fa (Albayrak 1987, 1993), Dalyan, roof of a house, colony of 8–9 ind (Baran et al 1994), – Fethiye [63] cave 9 Febr 1960 1m (Çaglar 1965, 1969) – Sultaniye [64] Ilica dist , 1 ind (Baran et al 1994), - Yaraslı koyu village [65] 30 ind (Albayrak 1993) - Rize Rize [66], house, 19 Sept 1967 1f (Steiner & Gaisler 1994) 20 Sept 1967 (Peus 1976) – Şenyuva [67], house, 31 August 1967 1f (Steiner & Gaisler 1994), – Ulku (S of Çamlıhemşin) [68], house, 31 August 1967 1f, 1 Sept 1967 2m, 10 Sept 1968 11f, 12 April 1969 1f (Steiner & Gaisler 1994, cf Peus 1976) 11 Sept 1968, 11 April 1969 (Peus 1976) Sakarya Adapazarı [69] Sakarya river, det (Helversen 1989b) – Tokat Turhal [70] Pazar bucagı 12 August 1978 1fj (Albayrak 1987 1990) – Van Erciş [71] Ataturk school 3 July 1979 nursery colony, coll 30fa, 1fj (Albayrak 1987, 1990) – Zonguldak Çaycuma [72], Saz koyu village, 5 ind (Albayrak 1993)

DISTRIBUTIONAL STATUS (Fig 22) *P pipistrellus* is the third most common bat species in Turkey (Tab 1) It is partialy common in the coastal regions while number of records is much smaller in arid areas of the Central and Eastern Anatolia

TAXONOMIC STATUS The first who mentioned taxonomical status of the Turkish population of *P pipistrellus* was Hanak (in Lehmann 1966) He attributed the whole Mediterranean population to *P pipistrellus mediterraneus* Cabrera, 1904 (terra typica Valencia, Spain) The other taxa that come in account, viz *P p bactrianus* Satunin, 1905 (t t Tedžen, Turkmenistan) and *P p aladdin* Thomas, 1905 (t t Iran) were studied by Neuhauser & DeBlase (1971), who considered them synonymous (with the prior name *P p aladdin*) and delimited the distribution range of this form from Lake of Van and Zagros Mts to Central Asia and China Moreover, Corbet (1978) suggested that the populations of Europe, Asia Minor and Palestina belong to the form *P p pipistrellus* (Schreber, 1774) (t t France) to which he synonymized also the form *P p mediterraneus* while the populations from Iran, Central Asia and Afghanistan he arranged under *P p aladdin* (sensu Neuhauser & DeBlase 1971) This view was adopted also by Harrison & Bates (1991), Koopman (1994) and DeBlase (1980) who contributed it with records of *P p pipistrellus* from Transcaucasia and Elborz Mts , while, at the same time, those from Kurdistan and Zagros Mts coidentified with *P p aladdin* Strelkov et al (*1978*) arranged the Turkmen population under *P p bactrianus* that he kept separat-

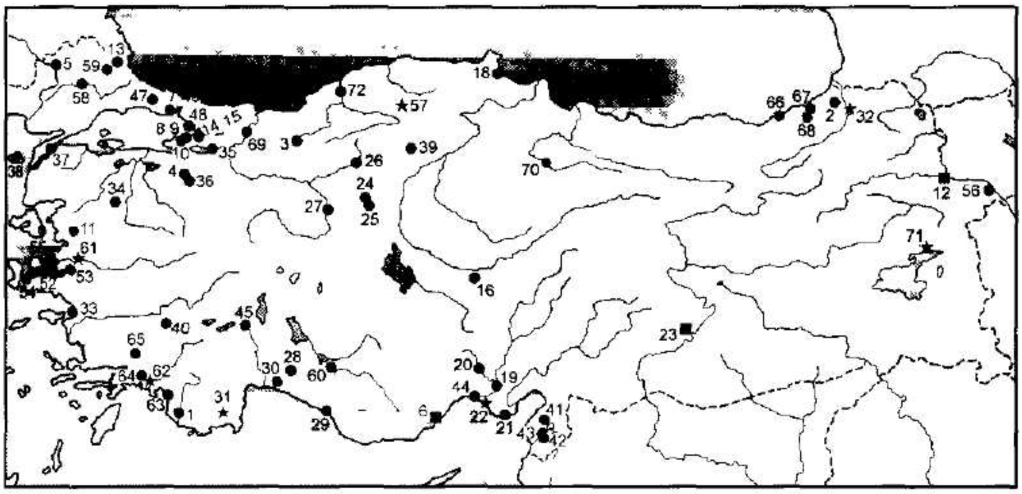

Fig 22 Records of *Pipistrellus pipistrellus* in Turkey For symbol explanations see Fig 4

ed from *P p. aladdin*. The Turkish sample has been evaluated by Albayrak (1987) and Steiner & Gaisler (1994). Albayrak (1987) attributed the samples from the Northern and Western Turkey to *P. p. pipistrellus* while those from the Turkish Kurdistan to *P. p. aladdin*. Between these two regions he expected a broad zone of transition (that was however doubted by the Cilician findings). On the contrary, Steiner & Gaisler (1994) attributed their sample from the Rize province (and proposed for whole Asia Minor) to the form *P. p. mediterraneus*, so they refused its synonymy with the nominotypic form.

Anyhow, systematics of *P. pipistrellus* has recently been considerably contributed with discovery of two clades differing both in echolocation and some genetic markers (Barratt et al. 1997, Jones & Parijs 1993 etc). Already the uncertainities with morphological discrimination between these two, genetically quite distant forms, suggest that *P. pipistrellus* may be just a taxon that include a considerable spectrum of hidden phyletic diversity and this may concern just of the "southern" forms we meet in Turkey.

Pipistrellus nathusii (Keyserling et Blasius, 1839)

RECORDS **Original data** Kırklareli *Velika Koprusu bridge (8 km SW of Demirkoy) [1], 15 Oct 1993 net. 3f*, CUP – Sakarya Denizkoy [2], solitary house, 3 April 1992 net 1f (leg Zukal), 5 April 1992 net 1m, 4f, 6 s i (leg Zukal), 6 April 1992 net 2m (leg Zukal). – **Literary data** Balıkesir Manyassee (= Kuş Gölü) [3], 30 Sept 1964 3m, 2f (Lehmann 1966) – Bitlis Tatvan [4], Karşıyaka mahallesi, 1 ind (Albayrak 1990) – Istanbul 3 km SW of Karaburun (Terkos Golu) [5], 20 May 1967 (Peus 1978a), – Stanbul (= Istanbul) [6], November 1958 1mj (23 July 1958 ringed in Voronež reserve, Russia) (Kameneva & Panjutin 1960, cf Strelkov 1969, 1971) – Anatolia (undef) Asia Minore (= Asia Minor), 1 ind. (as *Vesperugo abramus*, in Mus of Florence, Italy) (Doria 1887)

DISTRIBUTIONAL STATUS (Fig. 18). There are only five records of *P. nathusii* from Turkey, all representing marginal points of the species' distribution range (comp. Mitchell-Jones et al. in press, Strelkov 1997a, b). As shown by Strelkov (1997a, b) and Horáček et al. (1998) a great majority of records of *P. nathusii* refers to individual bats at time of seasonal migrations without any nursery colony having been recorded.

TAXONOMIC STATUS As Corbet (1978) and Koopman (1994) reported, this species is monotypic and all populations belong to the form *P nathusii nathusii* (Keyserling et Blasius, 1839) (terra typica Berlin, Germany) A lack of local variation is in a good agreement with social organisation of this species which includes a long distance seasonal migrations combinated with extensively promiscuous mating system etc

Pipistrellus kuhlii (Kuhl, 1817)

RECORDS **Original data** Adana Devecıuşagı [1], sea shore, 26 Oct 1991 net 1m (leg Červeny) – Antalya Kınık (n Kaş) [2], 23 April 1992 net 1f, CUP (leg Hanak) – Artvin Murgul [3], Damar, in the village, 3 Sept 1995 det min 1 ind – Bolu Bolu [4], environs of the town (Thermal), 12 June 1990 det min 2 ind – Edirne Edirne [5], town Selimiye Camii mosque, 28 Oct 1994 det 1 ind, neighbourhood of Edirne, 1993–1994 2 ind, TUE (leg Ozkan), – Erzurum Horasan [6], town, 11 Sept 1995 det 1 ind – Hatay Александретта (= Iskenderun) [7], 1895 2f, ZIN (spec Nos 5020, 5021, leg Rolle), 6 July 1899 1 ind, ZIN (spec No 6899, leg Zarudnyj), Iskenderun, city, 30 July 1991 net 2f, NMP (spec Nos 47901, 47902), – Çevlik [8], 3 July 1998 remains of two ind in pellets of *Strix aluco* (leg Obuch), – Konacık [9], 24 Oct 1991 net 1f, NMP (spec No 51475, leg Červeny) – Içel Narlıkuyu, Cehennem cave [10], 3 August 1992 net 1m, NMP (spec No 47923) – Istanbul Yalova [11], a town outskirts, 21 June 1990 det min 1 ind – Sakarya Denizkoy [12], solitary house, 5 April 1992 net 1f (leg Zukal) - Şanlı Urfa Harran [13], Sept 1991 coll 3m (leg Frynta & Sadlova), remains of 47 specimens in pellets of *Tyto alba* (leg Frynta & Sadlova) – no exact loc Turkish-Persian border, 25 April 1914 2 ind, ZIN (spec Nos 5007, 5008, leg Nesterov) – **Literary data** Adana Haruniye [14], end of May 1953, mummies (Lehmann 1966), – Toprakkale [15], ruins of crusader castle, 17 August 1977 1 ind (from owl's pellets) (Nadachowski et al 1990) – Sepici mahallesi [16], building of State Pest Control Research Institute, 10 ind (Albayrak 1993) – Antalya Finike [17], 11 ind (Albayrak 1993), – Kaş [18], 1 ind (Albayrak 1993) – Elazıg Alışam [19], 17, 25 to 27 Sept 1971 6m, 6f (Kock et al 1972), – Elazıg [20], 18 Sept 1971 1f (Kock et al 1972) – Erzurum Hasankale [21], Koprukoy bucagı, schoolhouse, 3 ind (Albayrak 1990) – Gaziantep Islahiye [22], 1 ind (Albayrak 1990), – Room Kaleh [23], Euphrates (Danford & Alston 1880) = Rumkale – Fırat (Çaglar 1965, 1969) Hatay 5 miles N of Iskenderun [24], curtain in a building, 10 August 1954 1m (DeBlase & Martin 1973), Antakya [25], 20 Febr 1960 1m (Çaglar 1965, 1969 cf Kahmann & Çaglar 1960), – Arsuz [26], building, 18 Oct 1954 3m, 6f (DeBlase & Martin 1973), – Aşagıoba koyu village [27], schoolhouse, 20 ind (Albayrak 1990), – Dermaeta koyu village (n Harbiye) [28] (Çaglar 1969) – Muradbası [*29*], middle of May 1953, mummies (Lehmann 1966) – Oglakoren koyu village [*30*], schoolhouse, 32 ind (Albayrak 1990), – Paşa koyu village [*31*], schoolhouse, 3 ind (Albayrak 1990), – Serinyol bucagı [32], Alahan koyu village, castle, 1 ind (Albayrak 1990), mosque, 13 ind (Albayrak 1990) – Içel Kitzkalesi (= Kızkalesı) (20 km E of Silifke) [33], 1 Sept 1975 1ma (Nader & Kock 1983), Silifke [34], behind window, 10 Febr 1961 1m, 4f (Çaglar 1965, 1969), Silifke, betw boards, 13 Febr 1961 1m, 2f (Çaglar 1965, 1969) – Kahraman Maraş Kahramanmaraş [35], house (Danford & Alston 1880) – Kars Aralych-Bezirk (= vicinity of Aralık) [36] (Satunin 1913), – Igdır [37], D U Ç (= state farm), 44 ind (Albayrak 1990) – Kayseri Kayseri (no exact loc) [38] (Çaglar 1965) – Mardin Atlı Village (= Kasra Kanco) (40 km SW of Mardin) [39], 28 July 1970 1m, 1f (Nader & Kock 1983), – Mardin ovası [40], 3 ind (Albayrak 1990) Mugla Dalaman [41], D U Ç (= state farm), 1 ind (Albayrak 1993), – n Fethiye [42] March 1960 2 ind (Osborn 1963) – Şanlı Urfa Ceylanpınar [43], 18 May 1968 1m, 1f (Lehmann 1969), – Harran [13], Şuayıpşar koyu village, ruins, 1 ind (Albayrak 1990), – Horozum koyu village [44], schoolhouse, 3 ind (Albayrak 1990), (=?) Horzumlu koyu village, tree hollow, 24 August 1961 1m, 11 Sept 1963 2m, 5f (Çaglar 1965, 1969), – Tokluoglu hill [*45*], 2 ind (Albayrak 1990)

DISTRIBUTIONAL STATUS (Fig. 23) *P kuhlii* is an euconstant element of Turkish bat fauna. It occurs in all biogeographic regions of Turkey (which otherwise holds true for *R ferrumequinum* only) In the Cilician coast and Mesopotamia, it is even the most common species at all (Tab 1) The same holds *true also for neighbouring southern regions, i e the Syrian and Iraq Mesopotamia and the Levant* (Harrison & Bates 1991) while it is not the case with those neighbouring Turkey in the North, since in most of the Balkans this species is fairly rare and/or absents at all (Mitchell-Jones et al in press)
TAXONOMIC STATUS Already Lewis & Harrison (1962) noted that in the Mediterranean region, the populations of *P kuhlii* exhibit considerable cline variation in pelage colouration, those from the southern regions being much paler than those in the European part of the region The paler forms

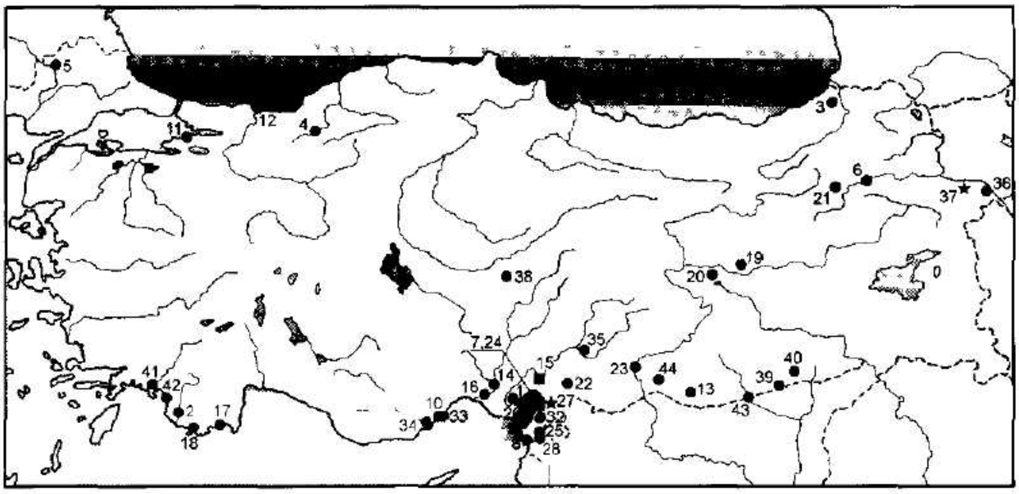

Fig. 23 Records of *Pipistrellus kuhlii* in Turkey. For symbol explanations see Fig. 4

were traditionally distinguished from the nominotypic form, *P. kuhlii kuhlii* (Kuhl, 1817) (terra typica: Terst, Italy), as separate subspecies. At least three names come here in account, viz. *P. k. lepidus* Blyth, 1845 (t. t.: Kandahar, Afghanistan), *P. k. ikhwanius* Cheesman et Hinton, 1924 (t. t.: Hufuf, Hasa, Saudi Arabia) and *P. k. marginatus* (Cretzschmar, 1830) (t. t.: Arabia Petraea). It is not clear, however, to which degree (and by which characters) these pale southern forms differ each from the other. Hence, some authors proposed their synonymy. Kock et al. (1972), who evaluated the East-Anatolian *P. kuhlii* in details, found it to be distinctly paler that bats from the European Mediterranean but resignated to decide whether it is to be identified as *P. k. lepidus* or *P. k. ikhwanius*. Gaisler (1970) evaluated the Afghan sample and concluded that the name *P. k. lepidus* is an older synonyme of *P. k. ikhwanius*. Kumerloeve (1975) suggested, according to Harrison (1964), that Turkey is colonized by the southern form *P. k. ikhwanius*. Corbet (1978) reported only the nominotypic form for the whole area of distribution of this species, perhaps in account of that the differences among populations are not stepped but gradual. Strelkov et al. (1978) and DeBlase (1980) with reference to Gaisler (1970), reported the form *P. k. lepidus* from Kopetdag Mts. and the whole Iran. DeBlase (1980) also supposed, that the name *P. k. lepidus* could be a younger synonym of the name *P. k. marginatus* and Qumsiyeh (1985), though noted the differences between the extremely pale form inhabiting Egypt and Palestine and the darker one from Lebanon, Syria and Turkey synonymized them all, i. e. at least *P. k. ikhwanius* (and supposedly also *lepidus*) with *P. k. marginatus*. Nader & Kock (1983) suggested that the Mediterranean populations are an intermediate form between *P. k. kuhlii* and *P. k. ikhwanius*. Harrison & Bates (1991) distinguished in Arabia the northwestern form under the name *P. k. kuhlii*, and the southern desert form under the name *P. k. ikhwanius*, but they described also an intermediate (in colouration) form of the Levant. Steiner & Gaisler (1994) mentioned from the Northern Iran intermediate forms (both in metrical and colouration characters) between *P. k. kuhlii* and *P. k. marginatus* (sensu Qumsiyeh 1985). Summing all this up, it seem possible to conclude that over the Eastern Mediterranean there is a gradual transition between a paler form in south and a darker one that can be coidentified with the nominotypic form. Whether at least in some parts of this region that cline approaches a pattern of a categorial variation (which then would substantiate different subspecific status of the respective population) remains a task of a further comparative study.

Unfortunately, although *P. kuhlii* represents a common species throughout whole the Mediterranean (being even one of index species of that region), and in some areas it has even expanded its range during last decades (cf. Rakhmatulina 1989, 1996, Bauer 1996, Strelkov & Il'in 1990), a detailed study of its geographic variation is still missing.

Nyctalus noctula (Schreber, 1774)

RECORDS. **Original data**: Edirne: Edirne [1], neighbourhood, 1994: 1 ind., TUE (leg. Özkan). – Kırklareli: Igneada, Longoz, river (n. a forest nursery) [2], 9 May 1992: net: 2 ind. (leg. Reiter, Andreas & Sádlová), – Igneada, Longoz, sea shore [3], 2 Sept. 1996: det. 1 ind., – Velika Koprusu bridge (8 km SW of Demirkoy) [4], 15 Oct. 1993: net: 2f, CUP, 31 August 1996: net: 1ma, NMP (spec. No. 47950). – **Literary data:** Adıyaman: Karadut [5], cave, 7 June 1992: 9 ind. (from owl's pellets) (Obuch 1994). – Edirne: Edirne [1], Selimiye Camii mosque, small colony, coll. 6 ind. (Albayrak 1993). – Içel: n. Tarsus [6], 23 July 1959: 1 ind. (Osborn 1963).

DISTRIBUTIONAL STATUS (Fig. 24). A limited number of records available from Turkey come from two regions: the woodland region of Thrace (Istranca Mts.) neighbouring the records in Bulgarian and Greek mountains (cf. Mitchell-Jones et al. in press), and the Southern Anatolia near to those in the Levant region (viz. Harrison 1962, Harrison & Bates 1991). Although a great deal of the Mediterranean records of *N. noctula* comes from the transient period and may concern migrants of the northern populations (Strelkov 1997a, b), it is apparently not the case at least with those from the Levant region (cf. Harrison 1962) and supposedly also those from the Southern Anatolia.

TAXONOMIC STATUS. Harrison (1962) based on the sample from Lebanon described a new subspecies *N. noctula lebanoticus* Harrison, 1962 (terra typica: Natural Bridge, Lebanon) distinguished from the nominotypic form *N. n. noctula* (Schreber, 1774) (t. t.: France) by a dark colour of pelage. He compared it with the Central Asian form *N. n. meklenburzevi* Kuzjakin, 1934 (t. t.: Tashkent, Uzbekistan) which is considered to be very pale, and with the East-Asian forms generally dark coloured but metrically different. He also mentioned the Persian examples of the nominotypic subspecies. Corbet (1978) reported *N. n. noctula* for Europe (incl. the Balkans), *N. n. lebanoticus* for the Levant, and *N. n. meklenburzevi* for the Central Asia. Records from Transcaucasia and Iran has been attributed to the nominotypic form only (DeBlase 1980, Strelkov et al. 1978).

As mentioned above, Strelkov (1997a, b) has supposed that all findings of *N. noctula* in the Mediterranean are just examples of migrating individuals which area of reproduction lies northern of ca 45° N (except for Caucasus Mts. and Transcaucasia). It seems quite probable, of course, that besides of them there exist even in that region a resident, supposedly non-migrating population, more or less isolated from those of the nominotypic form. This is the case of the Levant population and most probably it concerns also that of the Southern Anatolia. Unfortunately, the record is still so scarce that it is quite impossible to draw any definite opinion.

Nyctalus leisleri (Kuhl, 1817)

RECORDS. **Original data**: Bolu: Abant Gölu [1], S bank of the lake, 13 June 1998: det. min. 3 ind., net: 1ma, NMP (spec. No. 47979). – Kırklareli: Velika Koprusu bridge (8 km SW of Demirkoy) [2], 15 Oct. 1993: net: 1f, CUP, 16 Oct. 1993: net: 2f, CUP, 31 August 1996: net: 2m, NMP (spec. Nos 47948, 47949). – **Literary data**: Antalya: Kopru Irmagı (N of Beşkonak) [3], forest, 10 Oct. 1984: 1m (Helversen 1989b). – Kırklareli: 5 km W of Igneada [4], 15 May 1967 (Peus 1978a). – Ordu: Ordu [5], 9 Dec. 1960: 1m (30 July 1958 ringed in Voronež, Russia) (Panjutin 1980). – Rize: Hemşin (Çaglar 1969) = Ülku (S of Çamlıhemşin) [6], house, 29 August 1967: 1m, 31 August 1967: 1m, 10 Sept. 1968: 2m, 1f, 12 April 1969: 1m (Steiner & Gaisler 1994).

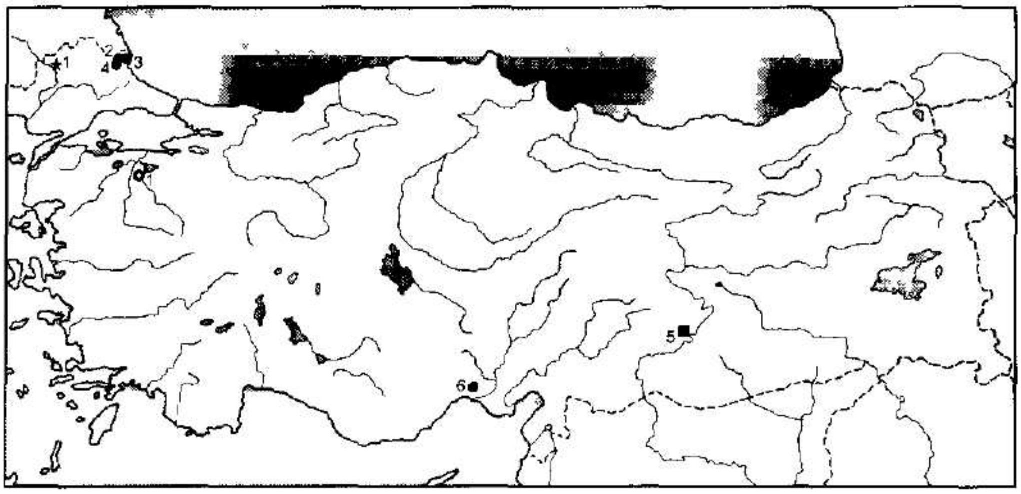

Fig 24 Records of *Nyctalus noctula* (closed symbols) and *N lasiopterus* (open symbol) in Turkey For symbol explanations see Fig 4

DISTRIBUTIONAL STATUS (Fig. 20). Few Turkish records represent the southern marginal points of the Eastern Mediterranean distribution range of *N. leisleri* (Corbet 1978, Mitchell-Jones et al. in press) A great majority of the East-Mediterranean records of this species come from the spring and/or autumn transient period and concerns not a resident population but migrants (Horáček et al. 1998). TAXONOMIC STATUS Corbet (1978) and Koopman (1994) has supposed that except for populations from the Atlantic islands (Madeira and Azores), *N leisleri* (*Kuhl, 1817*) (terra typica: Hanau, Germany) exists in just one nominotypic form This opinion is consistent also with that by DeBlase (1980) who evaluated the sample from Iran and Palmeirim (1991) who studied variation in the westernmost range of the species. Steiner & Gaisler (1994) with reference to them include their Turkish records in *N. l leisleri* what because of the above mentioned distributional reason is *undoubtedly a very substantiated. A question is, however, whether a lack of geographic variation* concerns also the Central-Asiatic part of the range colonized with mutually quite isolated and supposedly non-migrating local population (cf. Rybin et al. 1989).

Nyctalus lasiopterus (Schreber, 1780)

RECORD **Literary datum** Bursa Mustafakemalpaşa dist [1], tree hollow (Kahmann 1962)

DISTRIBUTIONAL STATUS (Fig. 24). Until now, *N. lasiopterus* has been from Turkey reported only once, probably at time of its migration period. Ten records are available from Caucasus Mts. and Transcaucasia (cf. Tsytsulina 1998), and, hence, this species can be expected also in the Northeastern Anatolia.

TAXONOMIC STATUS. Corbet (1978), DeBlase (1980) and Koopman (1994) considered this species monotypic and all its populations arranged under *N lasiopterus lasiopterus* (Schreber, 1780) (terra typica: Italy).

Otonycteris hemprichi Peters, 1859

Record **Literary datum.** Şanlı Urfa. Birecik [1], 11 May 1972 1m (Kumerloeve 1975)

Distributional status (Fig. 25). The only record of *O hemprichi* from Turkey represents the northwestern marginal point of its distribution range in the Middle East (viz. Horáček 1991, Nader & Kock 1983). The distributional pattern of this species is conform with that characterising the Saharo-Sindian Desert Mammals in the sense of Harrison (1964) which reach the northen margins of their distribution in Turkish part of Upper Mesopotamia.

Taxonomic status. Corbet (1978) reported for Israel and Arabia a subspecies *O. hemprichi jin* Cheesman et Hinton, 1924 (terra typica: Hufuf, Saudi Arabia), for Iraq *O. h. petersi* Anderson et de Winton, 1902 (t. t.: Fao, Persian Gulf, Iraq), and for Northeastern Iran *O. h. cinerea* Satunin, 1909 (t. t.: Bamrud, Khorasan, Northeastern Iran). The Turkish population apparently belongs to that inhabiting the Syrian desert and Palestine, where Qumsiyeh (1985) located the form *O. h jin*, the view adopted also by Koopman (1994). In contrary, Harrison & Bates (1991) has proposed that the form inhabiting the Syrian desert and Iraq should be classified as *O h. petersi* whereas *O. h. jin* inhabits the area more to the south. Horáček (1991) found a cline variation in size and pelage colouration from Maghreb through Egypt up to the Central Asia and doubted a reality of subspecies within this species at all.

Barbastella Gray, 1821

Records **Original data** Kırklareli Sarpdere [1], Dupnisa magarası cave, 16 Oct 1993 net 5m, 5f, CUP – Nevşehir Goreme [2], cave 500 NE, 26 July 1996. net. 1fa (leg Munclinger). – **Literary data** Adıyaman Karadut [3], cave, 7 June 1992 1 ind (from owl's pellets) (Obuch 1994) – Artvin. Ardanuç [4], cave, 12 August 1983 1fa (Helversen 1989b) – Rize Hemşin (= Ortakoy) [5] (Çaglar 1969), – Şenyuva (S of Çamlıhemşin) [6], house, 24 August 1967: 2m (Steiner & Gaisler 1994, cf Kumerloeve 1975); – Soga (n Tesine) [7], house, 6 Sept 1968, 1m (Steiner & Gaisler 1994, cf Kumerloeve 1975); – Ülkü (S of Çamlıhemşin) [8], house, 31 August 1967 2m, 2f, 1 Sept. 1967: 2m, 6 Sept. 1968 1m, 10 Sept. 1968: 1m (Steiner & Gaisler 1994, cf Kumerloeve 1975)

Distributional status (Fig. 25). Few records of barbastelle in Turkey come from three quite separated geographic regions: (a) Istranca Mts. in Thrace, (b) the Easternmost Pontus, and (c) steppes of Central Anatolia. While the former two are among just the best developed patches of humid woodland habitats in Turkey and both neighbour the non-Turkish regions from which more records of *B. barbastellus* are available (cf. e. g. Mitchell-Jones et al. in press, Bobrinskij et al. 1965), the region (c) differs quite a much. It is characterized with a dry and climatically quite severe rocky steppes of Central Anatolia almost without any woodland vegetation. Both the records in that region (Nos 2 and 3) are quite isolated as well from the former ones (that can be looked upon as offshoots of more or less continuous distribution of *B. barbastellus*) as from the other nearest records of this genus which are available from central Iran (DeBlase 1980) and Israel (Harrison & Makin 1988, Harrison & Bates 1991).

Taxonomic status. The genus is considered to consist of two species, both coming in account also in the Eastern Mediterranean and the Middle East (Bobrinskij et al. 1965, Corbet 1978, DeBlase 1980, Koopman 1993, 1994, Kuzjakin 1950, Vereščagin 1959, Pavlinov et al. 1995 etc.): *B. barbastellus* (Schreber, 1774) (terra typica: Burgundy, France) distributed in the northwestern part of Palearctic region (European temperate forests up to Caucasus Mts.) and *B. leucomelas* (Cretzschmar, 1826) (t. t.: Arabia Petraea [= Sinai]) in the major part of the Middle East (from the Northeastern Africa and Arabia to Central Asia). *B. leucomelas* consists of two subspecies, nominotypic *B. l. leucomelas*, and *B l darjelingensis* (Hodgson, 1855) (t. t.: Darjeeling, Northeastern India), the population of the Middle East being arranged under the nominotypic subspecies (Corbet 1978, DeBlase 1980,

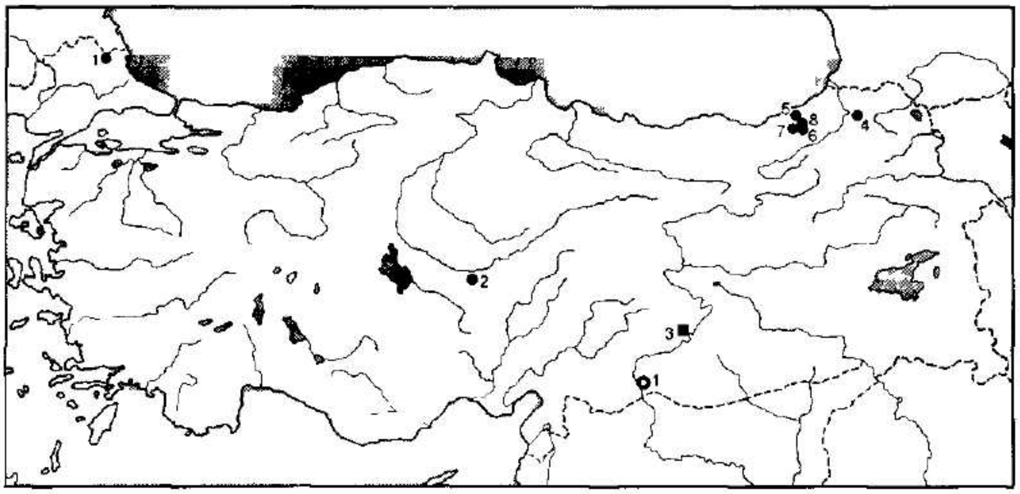

Fig 25 Records of *Otonycteris hemprichi* (open symbol) and *Barbastella* sp (closed symbols) in Turkey For symbol explanations see Fig 4.

Harrison & Bates 1991, Koopman 1994); Strelkov et al. (1978) synonymized with the nominotypic form also *B. l. caspica* Satunin, 1908 (t. t.: Kubaly, Pirsagat River, Azerbaijan) and *B. l. walteri* Bianchi, 1916 (t. t.: Transcaspia), comp. Kuzjakin (1934). *Barbastella barbastellus* is considered a monotypic taxon as a rule (Corbet 1978, Koopman 1994).

Both the species are discriminated particularly based on differences in shape of auricle, namely by a presence of a distinct lobule at the outer margin of pinae in *B. barbastellus* and its absence in *B. leucomelas*. As shown e. g. by Hackethal et al. (1988), both these character states occur even in a Mid-European population of *B. barbastellus* and, hence, its validity for species diagnosis is doubtfull Hackethal et al. (1988) demonstrated, moreover, that in the southern part of Central Europe, the frequency of "*leucomelas*" morphotype is higher than in the Northeastern Europe. Neither the other characters discriminating both the species (cf. Harrison & Makin 1988) are more impressive. These concern mainly bigger size and somewhat paler colouration in "*leucomelas*". According to Kuzjakin (1950) and Bobrinskij et al. (1965), the forearm lenght of the morphotype "*barbastellus*" is 36–41 mm, of the morphotype "*leucomelas*", it is 41.2–45 mm. Koopman (1994) reported 36–41, 38–45 mm respectively. DeBlase (1980) showed for *B. leucomelas* from Iran the forearm lenght 42.0–42.8 mm (n=3) There is no zone of sympatry except for southern Transcaucasia which is, of course, factually based on simultaneous appearance of the two auricle morphotypes only (Rahmatulina in litt.).

The individuals caught in humid woodland regions of Eastern Pontus and Thrace correspond in auricle characters to "*barbastellus*" morphotype (Helversen 1989b, Steiner & Gaisler 1994). The bat caught in Cappadocia was unusually big (forearm lenght 43.0 mm) and, unfortunately, it was letted free without its auricle morphotype was examined. Its size would fit rather to a variation range of "*lecomelas*" than "*barbastellus*" but neither this character is indeed discriminating (note a variation span of the forearm lenght in a sample of 405 individuals of *B. barbastellus* netted in one South-Moravian locality (Czech Rep.): 36.8–43.2 mm with a mean 39.5 mm, one individual over 43 mm and 6 over 42 mm).

Summing up, there are several critical moments in taxonomy of this genus. It is doubtful that the southern part of the range is colonized continuously as it is the case in the northern form, *B barbastellus*. The more probable is that it is splitted in mutually isolated and quite inabundant vicariant populations which share the characters that, in frame of the genus, are apparently plesiomorfic (e. g. auricle withouth a lobule, less developed lacrimal crest, less contrasting colouration etc.). Mutual relations between the eastern group of these populations (i. e. *B. l. darjelingensis*) and the *B leucomelas* s. str. seem to be even less apparent than the similarities between "*leucomelas*" and "*barbastellus*". The lectotype specimen of *B. leucomelas* (SMF No. 4373) is moreover of a small size (CM^3 4.6 mm, CM_3 5.0 mm) and falls largely in variation range of "*barbastellus*" morphotype (cf. also Kock 1969) In almost all regions, *B. lecomelas* s. l. is quite a rare species and, hence, the realistic data on actual variation pattern within individual populations, that are prerequisite to any taxonomic conclusion, are largely not available. Consequently, since the characters discriminating the respective named taxa are faint only and there is no clear prove of sympatry between any of them, it seem reasonable to consider them, for the moment, as vicariant elements of a sole polytypic species rather than a couple of distinct species. This concept is preferred at least because it calls for a carefull analysis of an overall pattern of geographic variation within whole the genus than for a search for seemingly reliable discriminating criteria established just with aid of a very limited comparative samples, as a rule.

Plecotus auritus (Linnaeus, 1758)

Records **Original data** Hatay Çevlik [1], ancient tombs, 1 July 1997 coll 1m, NMP (spec No 48087). – Kırklareli Sarpdere, Kız magarası cave [2], 17 Oct 1993. net 1m, CUP – Van Castle of Van [3], 28 July 1992 net 1f, NMP (spec No 47911) – **Literary data:** Erzincan Kemah, Castle of Kemah [4], Suluklar, 24 Sept 1978. 1ma (Albayrak 1990, 1991a) – Erzurum. Hasankale [5], Kopruköy, schoolhouse, 4 August 1980 5ma, 1fa. 18 June 1981 small colony (5fa) (A lbayrak 1990, 1991a) – Hatay: near Antakya [6], 20 Feb 1960 1m (Kahmann & Çaglar 1960, Çaglar 1965), – Antakya [7], aquaeductus, 20 Febr 1960· 1m (Çaglar 1965). - Habibineccar dagı [8] (Çaglar 1969). – Istanbul Tower of Fort Rummel Hisar [9], 2 Sept 1953 1f (DeBlase & Martin 1973) – Kars N bank of Çıldır Lake [10], tunnel, 11 August 1987. 1fa (Helversen 1989b). – "das Plateau von Kars" [11] (Satunin 1913) – Kayseri. Başakpınar, Orenonu, resp Orenkoyü [12], 20 June 1987 4ma, 1fa (Albayrak 1991a, 1993) – Konya· Aksaray road, 40 km, Akbaş Hani Kuyusu [13], 21 Sept. 1986 9fa (Albayrak 1991a, 1993), – Karapınar, Apak [14], 31 May 1976. 1ma (Albayrak 1991a) – Nevşehir Gulşehir, Açıksaray Harabeleri [15], 18 June 1987. 6fa (Albayrak 1991a, 1993) – Nigde Gumuşler, Eski Manastır [16], 26 May 1987. 1ma (Albayrak 1991a, 1993) - Rize: Ulkü (S of Çamlıhemşin) [17], house, 31 August 1967. 1m (Steiner & Gaisler 1994)

Distributional status (Fig. 26). *P. auritus* reaches in Turkey the southern margin of its distribution range (Mitchell-Jones et al. in press, Strelkov 1988). Besides of the Thracian and East-Pontic woodlans regions where this species can well be expected (cf. also *B. barbastellus*), a more than a half of its records come from two other regions with quite a different vegetation pattern. The two Thracian records continue those from the Bulgarian mountains, 6 records in the Pontic region can be similarly related to the Transcaucasian records (Strelkov 1988); but it is undoubtedly not the case either with five records from Central Anatolia by Albayrak (1991a, 1993) and three from the province of Hatay. Those from Hatay were doubted already by Harrison (1964) who considered the sample reported by Kahmann & Çaglar (1960) as *P. austriacus* (see Kumerloeve 1975, Nader & Kock 1983). In any case, it does not seem probable that distribution range is continuous in Turkey. The recent data suggests a vicariant situation, at least as concern: "the northern" (Thrace and Pontus) and "the southern" (Anatolian steppes and Hatay) populations.

Taxonomic status. Taxonomic status of the Turkish populations of *Plecotus auritus* has not yet been evaluated. More authors (Corbet 1978, Hanák 1966, Koopman 1994, Strelkov 1988) recognized in the Western Palearctics (from Caucasus Mts. to the west) just one subspecies *P. auritus*

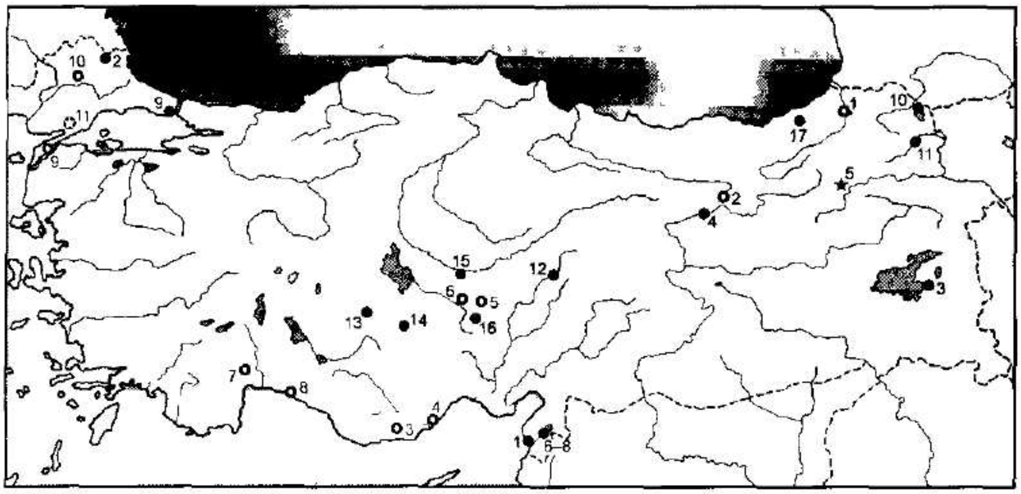

Fig. 26. Records of *Plecotus auritus* (closed symbols) and *P. austriacus* (open symbols) in Turkey. For symbol explanations see Fig. 4.

auritus (Linnaeus, 1758) (terra typica: Sweden). For Turkish material this opinion was adopted also by Helversen (1989) and Steiner & Gaisler (1994). Anyhow, an appearance of both the West-Palearctic species of the genus *Plecotus*, a smaller *Plecotus auritus* (Linnaeus, 1758) and a bigger *P. austriacus* (Fischer, 1829), in Turkey was mentioned by many authors (i. e., Kumerloeve 1975, Nader & Kock 1983, Helversen 1990). However, a larger sample was first collected by Albayrak (1991a) who used a shape of baculum as the diagnostic character to discriminate these species. Based on it (and perhaps also according to some metrical characters) he classified all his sample from Asia Minor as *P. auritus*, and a small sample from Thrace as *P. austriacus*. He also claimed that the other characters, i. e. cranial and dental ones, are for the Turkish populations not sufficiently specific. His results are in contrasts with the traditional opinions according to which all bats of the genus *Plecotus* in the Middle East belong to *Plecotus austriacus* that is represented there with a subspecies *P. a. christiei* Gray, 1838 (DeBlase 1980, Hanák 1966, Hanák & Elgadi 1984, Harrison 1964, Harrison & Bates 1991, Qumsiyeh 1985) characterised by a smaller body size but sharing with *P. austriacus* large bullae tympanicae. Also colouration in this form is paler and do not fit to the state in European *P. austriacus*. Albayrak (1991a) has identified whole his Anatolian material as *P. auritus* what sounds strange at least in respect to habitat requirements of *P. auritus* which in other regions are strictly linked to a woodland vegetation (cf. e. g. Hanák 1969).

Anyhow, the set of morphological characters by which Albayrak identify the South-Anatolian sample is undoubtedly valid and indeed differs considerably from that characterizing the nominotypic subspecies of *P. austriacus*. This situation reminds that described by Ibañez & Fernandez (1985) in their comparison of *Plecotus* bats from Canary Islands and Iberian peninsula. The bats from Canary Islands which correspond in body size to *P. austriacus* while in phenetic characters (shape of baculum, size of canines, shape of processus angularis and namely the lenght of thumb) they remind rather *P. auritus*, were evaluated as an independent species *Plecotus teneriffae* Barrett-Hamilton, 1907 (t. t.: Orotava, Teneriffe I.). Such a "mixture" of characters of both the "standard" Palearctic species is moreover typic also for Central-Asian populations which are usually, according to a standard classification scheme of the genus established by Hanák (1966), classified within *P. austriacus* (Strelkov 1988, Rybin et al. 1989). Simply said, it seems that in frame of the whole Palearctic region, the taxonomic situation of the genus *Plecotus* is perhaps much more intricated than it was expected and, undoubtedly, it calls for a new comprehensive revision. The situation revealed just in context of the Turkish *P. auritus* illustrates it quite a well. For the moment, we tentativelly conclude that (a) the populations from the northern arboreal zone of Turkey most probably indeed belong to *P auritus* s. str. while (b) the taxonomic status of those from the Central Anatolia and Hatay is to be kept uncertain until a detailed revision of the genus in frame of whole the Middle East is accomplished.

Plecotus austriacus **(Fischer, 1829)**

RECORDS **Original data** Artvin: Artvin [1], 1907: 1f, ZIN (spec No 8698, leg. Voronov, rev. Hanák; cf Strelkov 1988) – Gumuşhane. Guzyurdu [2], a small cave in a mountain pass 2300 m, 15 Sept 1995 obs 2-3 ind – Içel. Bozagaç, Yalan Dunya magarasi cave [3], 30 Oct. 1993 net 2m, 1f, CUP; – Narlıkuyu [4], small cave, 29 Oct 1993 net 1m, CUP – Kayseri: Yeşilhisar [5], 3 km NW Akkoy, Summer 1995, PMSL (leg Kryštufek) – Nigde Herala, Nargolu [6], cave, 29 July 1996: net. 1m (leg Munclinger). – **Literary data** Antalya· Karain cave (n Doşemeatlı) [7], 5 Sept. 1975 1m (Nader & Kock 1983). – Side [8], vault of ancient theatre, 13 April 1987 1m (Helversen 1989b) – Çanakkale. Gelibolu [9], Kilitbahir redoubts, 9 Sept 1983 1ma (Albayrak 1991a, 1993) – Kirklareli· Babaeski [10], Mimar Sinan Bridge, 8 July 1985: 1ma (Albayrak 1991a, 1993) Tekirdag· Kuru Dag [11], road tunnel, 19 July 1987 small colony, coll 4 ind. (1m, 1f) (Helversen 1989b)

DISTRIBUTIONAL STATUS (Fig. 26). The situation concerning this species is not completely clear because of the reasons mentioned in the previous species. On the base, of known records, it can be assumed that the distribution of *P. austriacus* in Turkey covers the distribution pattern discussed in the frame of the previous species. Both in Balkans neighbouring the Thracian Turkish records and in Transcaucasia connected with those from the Eastern Pontus, *P. austriacus* ranks among relativelly common species and more records are reported also from the Levant (Harrison & Bates 1991). Relations among the populations of these regions remain, even in respect to the Turkish record, unclear, of course. A lack of records in the Northern Anatolia as well as in the Western Anatolia is also worth of attention.

TAXONOMIC STATUS. The major problems concerning the Turkish *P austriacus* have already been discussed in context of the previous species. Anyhow, even in frame of a traditional concept the situation is far of being easy. The European range is attributed to the nominotypic subspecies *P. austriacus austriacus* (Fischer, 1829) (terra typica: Vienna, Austria) while the population in the Adriatic islands were described as a separate subspecies *P a. kolombatovici* Dulić, 1980 (t. t : Žrnovo, Korčula I., Croatia) that tentatively was accepted by other authors (Horáček et al. in press, Koopman 1994, Strelkov 1988). In the Middle East region, there are, of course three to four other named forms that come here in account, viz. *P. a. christiei* Gray, 1838 (t. t.: Northern Africa [= Sinai]), *P. a. wardi* Thomas, 1911 (t. t.: Ladak, Kashmir), *P. a. macrobullaris* Kuzjakin, 1965 (t. t : Vladikavkaz, Caucasus Mts., Southern Russia), and *P a. turkmenicus* Strelkov, 1985 (t. t.: Mangyšlak, Western Ustjurt, Turkmenistan). Hanák (1966) named subspecies *P. a austriacus*, in European range, incl. Caucasus Mts., *P. a. wardi* in the Central Asia, and *P. a. christiei* in the Northern Africa. Hanák's opinion was generally accepted and shared also by Corbet (1978) and Koopman (1994) who supplements it with the Caucasian subspecies *P. a. macrobullaris*. DeBlase (1980) preliminary arranged the Persian population under the subspecies *P. a. wardi*. The last and the most detailed revision was published by Strelkov (1988). He analysed the population of the East-European and Asian range and draw for it the following subspecific arrangement: *P. a austriacus* (Europe to the Southern Ukraine), *P. a. wardi* (Caucasus Mts., Transcaucasia, Asia Minor, Iran and the mountains

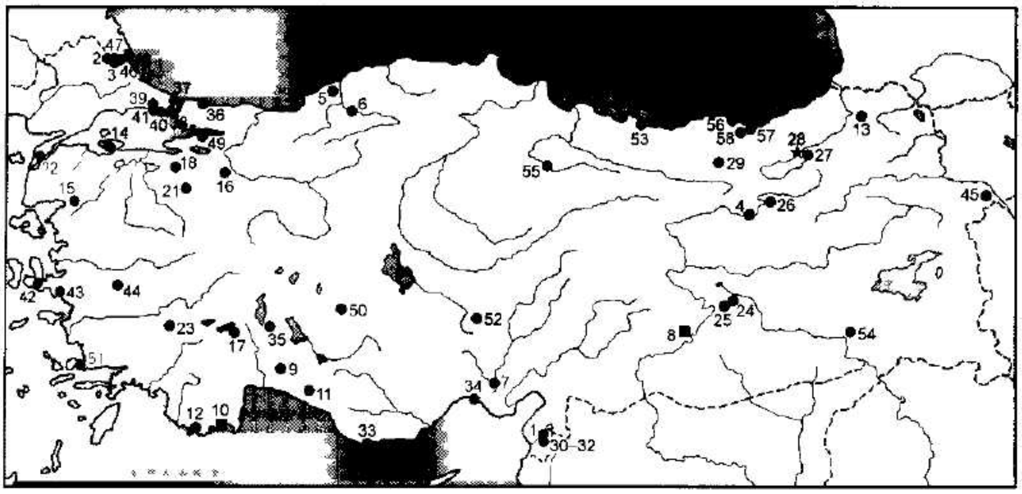

Fig 27 Records of *Miniopterus schreibersii* in Turkey For symbol explanations see Fig 4

of the Central Asia), *P a turkmenicus* (Kopetdag Mts and the Northwestern Karakum desert), *P a kozlovi* Bobrinskoj, 1926 (t t Barun Zasak, Eastern Tsaydam, China) in the Central Asia (Mongolia and the Eastern Turkestan) and *P a christiei* from the Northern Africa As the Turkish material is concerned, Helversen (1989b) described his material as a typical *P austriacus* but differing in colouration from the Central-European samples, and our own experiences fit these observation too

Miniopterus schreibersii (Kuhl, 1817)

Records **Original data** Hatay Антиохия (= Antakya) [1] 2m ZIN (spec Nos 5012, 5013, leg Rolle) – Kirklareli Sarpdere, Dupnisa magarası cave [2], 16 Oct 1993 net 16m, 12f, CUP, Summer 1995, PMSL (leg Krystufek), – Velika Koprusu bridge (8 km SW of Demirkoy) [3], 15 Oct 1993 net 1f, CUP – Tunceli blind train tunnel in the Euphratus river valley n Derebuk village [4], 14 Sept 1995 1f, CUP – Zonguldak Çayır [5] Çayırkoy magarası cave, 20 Oct 1993 net 2m, 1f, CUP, Yenice [6], a large cave n railway, 2 July 1994 net 3m CUP – **Literary data** Adana Haruniye [7], 37 mummies (Lehmann 1966) – Adıyaman Karadut [8], cave 7 June 1992 1 ind (from owl's pellets) (Obuch 1994) – Antalya Beşkonak [9], Kopru Irmagı river, 10 Oct 1984 1f (Helversen 1989b), – Finike [10], Cliff cave, sum 1965 1 skull (Corbet & Morris 1967), – Incekum [11], 20 22 May 1966 35 ind (Kock 1974), – Kaş [12], Limanagzı, Hızırellez magarası cave, 1 ind (Albayrak 1993) Artvin cave N of Ardanuç [13], 12–13 August 1983 5m, 4f (Helversen 1989b) – **Balikesir** Erdek [14], cave, 7 Oct 1967 5m, 5f (Steiner & Gaisler 1994), – **Havran** [15], cave, 17 May 1961 1m, 2f, 11 April 1965 7m (Çaglar 1965, 1969), Inonu koyu magarası cave, 3 ind (Albayrak 1993) Bilecik Bilecik [16], cave, 26 April 1961 1f (Çaglar 1965, 1969) – **Burdur** Insuyu magarası cave [17], 11 April 1966 5 ind (Kock 1974), (date undef) 3 ind (Albayrak 1993) – **Bursa** Bursa [18], 20 April 1966 47 ind (Kock 1974), – Inkaya Koyu village, Suini cave [*19*] 11 May 1955 3m, 1f (Strinati 1959), 17 Oct 1963 1m, 6f, 24 May 1964 11m, 15f (Çaglar 1965, 1969), – Inkaya, Kusini cave [*20*], 18 March 1969 1m, 5f (Kock 1974), Kuşini magarası cave, 1 ind (Albayrak 1993), – Nilufer Çayı creek (S of Uludag Mts) [21], 21 July 1983 1m (Helversen 1989b) **Çanakkale** 4 km S of Yalova [22], 29 May 1967 and 8 May 1968 (Hůrka 1972), 7 May 1968 (Peus 1978a) – Denizli Fındıkdagı [23], cave 3 May 1963 2m, 2f (Çaglar 1965) – **Diyarbakir** Çayirdere (W of Ergani) [24], 23 Oct 1968 1m (DeBlase & Martin 1973), – Çermik [25], Kalecik koyu magarası cave, 4 ind (Albayrak 1990) – Erzincan Tercan [26], Mamahatun kervansarayı, 11 ind (Albayrak 1990) – Erzurum Çamlımagara [27], cave, 10 Sept 1967 3m, 4f, 1 mummy (Steiner & Gaisler 1994), – Ispir [28], Elmalı village, cave, 6 August 1983 a colony about 200 ind (Helversen 1989b), Çamlica magarası cave, 24 ind (Albayrak 1990) – **Gumuşhane** Mescitli koyu [29], 7 ind (Albayrak 1990) – Hatay Dermacta koyu village (n Antakya)

[30] (Çaglar 1969) – Harbiye magarası cave [31], 2 ind (Albayrak 1990), Harbiye, cave, 23 Febr 1960 1m 19 May 1960 9m (Çaglar 1965), – Narlıca koyu village [32], cave, 19 Febr 1960 2m, 2f (Kahmann & Çaglar 1960 Çaglar 1965, 1969) Karanlık magarası cave, 3 ind (Albayrak 1990) Içel Anamur [33] ruins, 18 Febr 1961 1f (Çaglar 1965 1969), – Kulakkoy village [34], abandoned houses, Spring 1987 obs 2 ind (van Winden 1988) – Isparta Aksu (Anamas) [35], Zindan magarası cave, 8 ind (Albayrak 1993) – Istanbul 10 km W of Sile [36], Satzmal magarası cave, 29 April 1955 4 ind (Strinati 1959) – Belgrat Orman [37], 23 May and 25 June 1968 (Hůrka 1972) – tower of Fort Rummel Hisar [38], 1 Sept 1953 13m, 1f (DeBlase & Martin 1973), – Gokceli (n Çatalca) [39], cave, 26 May 1960 9m, 6f (Çaglar 1965, 1969), – Kuçukçekmece [40] (Çaglar 1969), Halkalı, 15 May 1971 19m, 9f (DeBlase & Martin 1973, Peterson et al 1976) – Yarımburguz [41], cave, 22 April 1959 2m, 2f 19 May 1960 1m (Çaglar 1965) – Izmir betw Çeşme and Urla [42], street, 14 April 1969 1 ind (Kock 1974), Gumuldur [43], Incirli pit, 1 ind (Albayrak 1993) – Zeytinlik koyu village [44], cave, 20 April 1963 2m (Çaglar 1965 1969) – Kars Aralık, Kuçuk Agrı Dagı (Lesser Ararat Mt) [45], Serdarbulak yaylası, 15 ind (Albayrak 1990) – Kırklareli Demirkoy [46] cave, 17 July 1961 6m, 1f (Çaglar 1965, 1969), – Demirkoy, Samandere (= Sarpdere) koyu village, Kız magarası cave [47], 2 ind (Albayrak 1993) – Igneada [48] Tripez magarası cave 5 ind (Albayrak 1993) – Kocaeli Ayazma koyu village (n Karamursel) [49] cave, 29 Dec 1959 1f (Çaglar 1965, 1969) – Konya Sızma koyu village [50], Kuzey magarası cave 3 ind (Albayrak 1993) Mugla Farilya koyu village (n Bodrum) [51], cave, 2 April 1964 11m, 1f (Çaglar 1965, 1969) – Nigde Gumuşler [52], Epcik magarası cave, 2 ind (Albayrak 1993) – Ordu Yaraşlı koyu village [53], 40 ind (Albayrak 1990) – Siirt Saglarca (Billursı) koyu village [54], 8 ind (Albayrak 1990) – Tokat Turhal, Pazar (Abayel) koyu village [55], Inderesi mevkii 5 ind (Albayrak 1990) – Trabzon Akçaabat [56], cave, 12 Sept 1961 2m, 10f (Çaglar 1965, 1969), 20 Sept 1967 2m, 2f, 4 April 1969 5m, 6f (Steiner & Gaisler 1994) – Kireçhane [57], cave, 21 June 1960 1m (Çaglar 1965, 1969), – Maçka, Bagışlı (= Barışlı) koyu village [58], 8 ind (Albayrak 1990) Zonguldak Yenice (n Karabuk) [6], cave, 4 Jan 1960 1m, 3f (Çaglar 1965, 1969)

DISTRIBUTIONAL STATUS (Fig 27) *M schreibersii* has been recorded in all biogeographic regions of Turkey (Tab 1), except for the Mesopotamian steppes The most records come from the coastal regions

TAXONOMIC STATUS Corbet (1978) coidentified whole the European population with *M s schreibersii* (Kuhl, 1817) (terra typica Banat, Hungary), those from Asia Minor and Caucasus Mts up to Kopetdag Mts with *M s pallidus* Thomas, 1907 (t t shore of Caspian Sea, Iran) while the Eastern ones from India to Japan with *M s fuliginosus* (Hodgson, 1835) (t t Nepal) The differences between the nominotypic form and *M s pallidus* lie mainly in a paler colouration of the latter, and in this respect, many authors (DeBlase 1980, Harrison & Bates 1991, Koopman 1994, Nader & Kock 1987, Strelkov et al 1978) confirmed that concept of subspecific subdivision which attributed the territory of Asia Minor to *M s pallidus* The Turkish material was actually analyzed only by Steiner & Gaisler (1994) who identified *M s schreibersii* in the Western Anatolia (record No 14) and *M s pallidus* in the Eastern Anatolia (provinces of Trabzon and Erzurum)

***Tadarida teniotis* (Rafinesque, 1814)**

RECORDS **Original data** Artvin Murgul, Damar [1], in the village, 3 Sept 1995 det min 1 ind – Erzurum Hinis [2], town, 13 Sept 1995 det 1 ind – Eskişehir a rocky massiff 10 NE of Sivrihisar [3] 4 July 1994 det 2–3 ind – Gumuşhane Guzyurdu, a mountain pass 2300 m [4], 15 Sept 1995 det 1 ind – Hatay Konacık [5], a rocky fissure, 24 Oct 1991 obs min 3 ind (leg Červeny) – Içel Narlıkuyu [6], a cliff above sea shore 28 Oct 1991 obs 1 ind (leg Červeny) – Izmir Bergama [7], in the town, 3 Nov 1993 det min 1 ind – Kayseri Akkoy [8], bank of lake, 20 Oct 1991 det 1 ind (leg Červeny) – Tokat Castle of Tokat [9], 17 Sept 1995 det 1 ind – **Literary data** Agrı Hamur Çayı creek bank [10], 9 ind (Albayrak 1990) – Ankara Yassıhoyuk (= Gordion) [11], 25 June 1983 det (Helversen 1989b) – Antalya Finike, Cliff cave [12], sum 1965 1 mandible (Corbet & Morris 1967), – Finike, harbour [13], 4 Oct 1984 det (Helversen 1989b), – Manavgat river (n Ibradı) [14], bridge, 28 June 1986 det (Helversen 1989b), – Topraktepe (n Akseki) [15] mountains 6 Oct 1984 det (Helversen 1989b) – Artvin n Ardanuc [16], small river, 12 August 1983 1ms (Helversen 1989b) – Burdur S edge of the Burdur lake [17], 1 July 1986 det (Helversen 1989b) – Çanakkale SE of Ayvacık [18], 3 April 1987 det (Helversen 1989b) – Erzurum Erzurum [19] (Lewis & Harrison 1962) – valley of Çoruh Nehri river (E of Ispir) [20], 5 August 1987 det (Helversen 1989b) – Giresun Kumbet (S of Dereli) [21], 31 July 1983 obs (Helversen 1989b) – Hatay Belen, above the Topbogazı Gecidi pass [22], 9

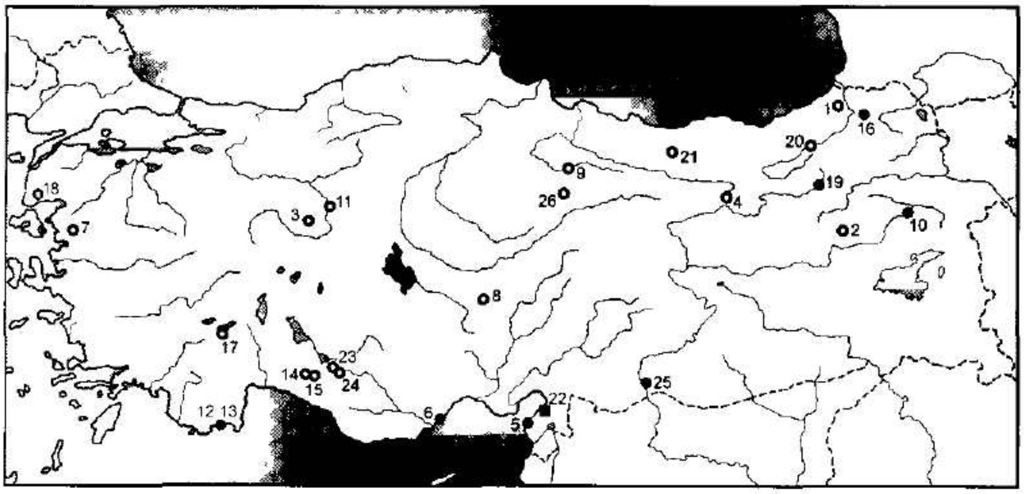

Fig 28 Records of *Tadarida teniotis* in Turkey For symbol explanations see Fig 4, open symbols denote bat detector records

June 1992 1 ind (from owl's pellets) (Obuch 1994) - Konya: Uçpınar (n Bozkır) [23], 27 June 1986 det (Helversen 1989b), - valley of Göksu Nehri river (n Hadım) [24], 24–26 June 1986 det. (Helversen 1989b) – Şanlı Urfa Birecik [25], Euphrates bridge, 26 May 1964 4f (Lehmann 1966, Kumerloeve 1975), date undet. 4 ind. (Albayrak 1990) – Sivas Çamlıbel pass (n Yıldızeli) [26], 25 July 1987 det (Helversen 1989b).

DISTRIBUTIONAL STATUS (Fig. 28). In comparison with the last survey of distribution of this species in the Mediterranean region (Kock & Nader 1984) which reported only two records of *T. teniotis* in the Southern Anatolia and one from Erzurum (Northwestern Anatolia), the picture of this topics has radically changed. The recent records suggest that *T. teniotis* is distributed probably over almost whole the Asian part of Turkey.

TAXONOMIC STATUS. The first, who noticed the Turkish population of *T. teniotis* was Lehmann (1966). He attributed the findings from Birecik to the nominotypic form *T. t. teniotis* (Rafinesque, 1814) (terra typica: Sicily, Italy). Hayman & Hill (1971) supposed, that populations living in Egypt, in Maghreb and in the Middle East belong to the form *T. teniotis rueppelli* (Temminck, 1826) (t. t.: Egypt). Corbet (1978) considered this name as a synonyme of the nominotypic which he applied for the whole Western Palearctics. Kock & Nader (1984), who revised the type material and the distribution of this species, considered the Turkish population as a part of the Middle Eastern population that should, according to them, belong to the colour different *T. t. rueppelli*, the view adopted also by some other authors (Harrison & Bates 1991, Qumsiyeh 1985). DeBlase (1980) respects both subspecies but the finding from Elborz Mts. (Northern Iran) he arranges under the form *T. t. teniotis*. The form *T. t. rueppelli* he shows just from the coast of the Persian Gulf.

Similary as in many other species, also in the case of *T. teniotis*, it holds that without geographic variation over whole species range is comprehended, the taxonomic status of the Turkish population cannot be established for sure.

DISCUSSION AND CONCLUSIONS

Until present, the bat fauna of Turkey consists of 31 species (see Tab. 1). Except for two (*Myotis dasycneme, Eptesicus nilssonii*) it includes all species composing the European continental bat fauna (sensu Mitchell-Jones et al. in press), what means 29 species and 94% of the European species. On contrary, the Turkish bat fauna is richer by *Rousettus aegyptiacus* and *Otonycteris hemprichi* that absent in Europe. Out of 44 species composing the Middle East bat fauna (in sense of DeBlase 1980, Harrison & Bates 1991, Horáček & Hanák 1984, and Steiner & Gaisler 1994; the Tropical Ethiopian Mammals in sense of Harrison 1964 being excluded), 27 species, i. e. 61% were found also in Turkey. In general, Turkish bat fauna exhibits maximum resemblace to the West-Palearctic arboreal. Most of the elements characteristic of the Arabian South Palearctic eremial (i. e. *Rhinolophus clivosus, Tadarida aegyptiaca, Eptesicus nasutus, Hypsugo ariel* (incl. *H. bodenheimeri* and *H. arabicus*), *Pipistrellus rueppelli*, as well as the families Rhinopomatidae, Emballonuridae, Nycteridae, and Hipposideridae) do not reach the territory of Turkey and/or are represented with quite exceptional marginal records (*Otonycteris hemprichi, Rousettus aegyptiacus*). The only two species of such a character occur here more regularly, viz. *Pipistrellus kuhlii* and *Eptesicus bottae*, both attaining maximum abundance in the South-Anatolian coast regions.

However, only a few species inhabit the whole Turkish territory (i. e. all biogeographic regions) and only two were actually found in all biogeographic zones, viz. *Rhinolophus ferrumequinum* and *Pipistrellus kuhlii*. Both the species are distributed as well in most of the Mediterranean as in the regions of the Levant and Mesopotamia (Harrison & Bates 1991).

In Turkey, many species reach the southern and/or the southeastern margin of their World distribution. This is characteristic of the elements of the West-Palearctic arboreal that are distributed mainly in the zone of temperate forests and reach maximum density in continental Europe and Siberia. The following members of the Turkish fauna belong in this group: *M. bechsteinii, M. mystacinus, M. brandtii, M. daubentonii, V. murinus, P. nathusii, N. leisleri, N. lasiopterus, B. barbastellus* (s. s.) and *P. auritus*. These species do not live more to the south, i. e. in Arabia sensu Harrison (1964), some of them, however, appear in the fauna of Iran (DeBlase 1980, Steiner & Gaisler 1994). *M. myotis*, and also *M. capaccinii*, reach in Turkey the eastern margin of their distribution range. *M. myotis* occurs also in the coastal areas of the Levant up to the Central Israel (Harrison & Bates 1991) but it does not live to the east from the Rize–Erzurum–Diyarbakir–Antakya line in Turkey (see Fig. 10). *M. capaccinii* inhabits only the Aegean and Levantine coastal areas from Thrace up to Hatay (see Fig. 17) and Israel, respectively (similary as *M. myotis*), i. e. a relatively humid areas but it also reaches, of course, the lower Mesopotamia and the Southern Iran (DeBlase 1980, Harrison & Bates 1991, own data).

The next group of species consists of those which are distributed in almost whole territory of Turkey except for Mesopotamia. These forms belonging to a group of "Boreal Eurasian Mammals" in the sense of Harrison (1964: Fig. 1) are distributed also in all neighbouring regions except for just the Mesopotamian steppes, i. e. in the Levantine coast, in a region north of Dead Sea, Zagros Mts. and in the Northern Iran up to Kopetdag Mts. (DeBlase's 1980 "Northern" species). Such a distributional pattern can be observed in *R. euryale, M. blythii, M. emarginatus, E. serotinus, H. savii*, and *P. pipistrellus*, and probably also in *M. nattereri*. To a considerable degree it fits also to a situation revealed in *R. hipposideros, R. blasii, P. austriacus*, and *M. schreibersii* which ranges continue much far in the south.

The last group consists of species which reach just in Turkey the northern and/or the northwestern margin of their distributional range (Fig. 30). This group consists of *R. aegyptiacus, E. bottae*, and *O. hemprichi*, in the moment, although its enrichment with extralimital records of some other species can be expected. First, this may concern of *Taphozous nudiventris* Cretzschmar, 1830, Tab. 1. Number of records in individual biogeographic units (see text and Fig. 3)

Species \ region	1a	1b	1c	1	2a	2b	2c	2	3	4	5	6	Suma
Rousettus aegyptiacus	–	–	–	–	–	3	11	14	–	–	–	–	14
Rhinolophus ferrumequinum	6	22	10	38	15	11	14	40	10	13	–	3	104
Rhinolophus hipposideros	5	12	15	32	9	3	7	19	5	6	3	–	65
Rhinolophus euryale	15	5	7	27	7	6	–	13	4	3	–	–	47
Rhinolophus mehelyi	7	3	–	10	3	1	5	9	4	1	–	–	24
Rhinolophus blasii	9	3	–	12	3	7	4	14	3	–	–	–	29
Myotis myotis	7	9	7	23	6	6	6	18	17	5	(3)	–	63
Myotis blythii	9	8	4	21	4	5	10	19	10	19	13	–	82
Myotis bechsteinii	3	–	1	4	–	1	–	1	–	–	–	–	5
Myotis nattereri	1	–	1	2	3	8	2	13	–	–	2	–	17
Myotis emarginatus	5	1	1	7	4	4	2	10	–	2	–	–	19
Myotis mystacinus	2	8	6	16	2	3	2	7	–	3	2	–	28
Myotis brandtii	–	–	2	2	–	–	–	–	–	–	–	–	2
Myotis daubentonii	3	4	–	7	–	–	–	–	–	–	–	–	7
Myotis capaccinii	8	5	–	13	2	5	6	13	1	–	–	–	27
Vespertilio murinus	–	1	–	1	–	–	–	–	–	2	–	–	3
Eptesicus serotinus	1	9	6	16	1	7	2	10	8	3	3	–	40
Eptesicus bottae	–	–	–	–	3	8	6	17	–	1	–	–	18
Hypsugo savii	–	2	3	5	–	2	3	5	4	2	2	–	18
Pipistrellus pipistrellus	9	19	5	33	13	7	9	29	6	1	3	–	72
Pipistrellus nathusii	3	2	–	5	–	–	–	–	–	1	–	–	6
Pipistrellus kuhlii	1	3	1	5	1	4	22	27	1	2	4	6	45
Nyctalus noctula	4	–	–	4	–	–	1	1	–	1	–	–	6
Nyctalus leisleri	2	1	2	5	–	1	–	1	–	–	–	–	6
Nyctalus lasiopterus	–	1	–	1	–	–	–	–	–	–	–	–	1
Otonycteris hemprichi	–	–	–	–	–	–	–	–	–	–	–	1	1
Barbastella barbastellus s. l.	1	–	5	6	–	–	–	–	1	1	–	–	8
Plecotus auritus	2	–	1	3	–	–	4	4	5	1	4	–	17
Plecotus austriacus	2	–	2	4	1	3	1	5	2	–	–	–	11
Miniopterus schreibersii	10	10	8	28	7	6	6	19	4	6	1	–	58
Tadarida teniotis	–	–	4	4	2	6	4	12	6	1	3	–	26
Total (no. records)	115	128	91	334	86	107	127	320	91	74	40	10	869
Total (no. species)	23	20	20	28	18	22	21	24	17	20	11	3	31
records per species	5.0	6.4	4.6	11.9	4.8	4.9	6.0	13.3	5.4	3.7	3.6	3.3	28.0

that is widely distributed in Mesopotamia almost up to Mosul (the nearest ca 150 km from the Turkish border) (Harrison & Bates 1991, own data). However the closest (ca 60 km from the Turkish border) is a site in Basket Mts., on the western bank of the Urumiyah Lake, Northwestern Iran, that repeatedly provided in total 36 specimens (DeBlase 1980, Lay 1967). An other species that can be expected in the Turkish territory, is *Asellia tridens* (Geoffroy, 1813). The northern margin of its distributional range runs through the Central Syria, Mesopotamia and Zagros Mts. (DeBlase 1980, Harrison & Bates 1991). The closest finding has been reported by Wettstein (1913): 49 specimens from Mosul (Northern Iraq), so ca 100 km to the south from the Turkish border. A distribution pattern similar to *O. hemprichi* exhibit also *Rhinopoma microphyllum* (Brünnich, 1782) and *R. hardwickei* Gray, 1831 (viz. van Cakenberghe & de Vree 1994). Although they are not known from Syria, this does not mean too much because of almost a complete lack of knowledge on bats of that country (cf. Benda 1996). Out of "the southern" species, known from the Lower Mesopotamia and/or the Southern Levant (sensu DeBlase 1980, Harrison & Bates 1991), also *Eptesicus nasutus* (Dobson, 1877) and *Pipistrellus rueppelli* (Fischer, 1829) may come in account, eventually. Their closest records (cf. Harrison & Bates 1991) are, of course, already fairly distant from the Turkish border.

Although it is greatly probable that there will be more addition to a list of Turkish bat fauna, it seems less probable that it will be due to the species which main ranges lie northeastern and/or northwestern of the Turkish territory, i. e. those inhabiting the Balkans and/or Trancaucasia. One of such species is *Eptesicus nilssonii* (Keyserling et Blasius, 1847) which is known both from Transcaucasia (Azerbaijan, Georgia) and the Northern Iran, and from Bulgaria (DeBlase 1980, Hanák & Horáček 1986). All its records from these regions are quite exceptional, of course, and are related to patches of boreal woodlands, mutually quite isolated. If it is so, then it cannot be excluded that such an isolated population could inhabit also the higher altitudes of the Northern Turkey, like Istranca Mts., Armenian Highlands or the Eastern Pontic Mts. Similary, *M. brandtii* announced so far only from the Eastern Pontus, can be found in Instanca Mts. since in the Southern Bulgaria it has already been recorded (Horáček et al. 1974). The other forms unknown from Turkey, as yet, are *Myotis schaubi* Kormos, 1934, and *Eptesicus bottae ognevi* (Bobrinskii, 1918) reported from Transcaucasia and from the Northern Iran. In the Nakhichevan (= Naxçivan) part of the Araxes River valley they were recorded directly from the Turkish border (viz. Horáček & Hanák 1984, Nader & Kock 1990). Therefore they can probably live also on the Turkish site of this valley, and maybe even further to the north-west (cf. Koopman 1994).

The structure of chiropteran records obtained from individual biogeographic units (Tab. 1) was examined with aid of parametric correlation and UPGMA cluster analysis. The results (Fig. 29) splitted whole the region in three areas exhibiting a corresponding degree of faunal similarity, viz. (1) the humid western and coastal northern part of Turkey, (2) the arid regions of the Central and Eastern Anatolia, and (3) the southern parts (East-Levantine coast, Mesopotamia) which fauna is the most distant from all. Worth mentioning is also the pattern of relations among the areas of the group (1). A compact group of the Thrace, exhibiting the Balkan faunal pattern and the region of Northwestern Anatolia is faunally closely related to the western coast of Anatolia, apparently influenced also with effect of the Aegean archipelago. The most relative to them is fauna of

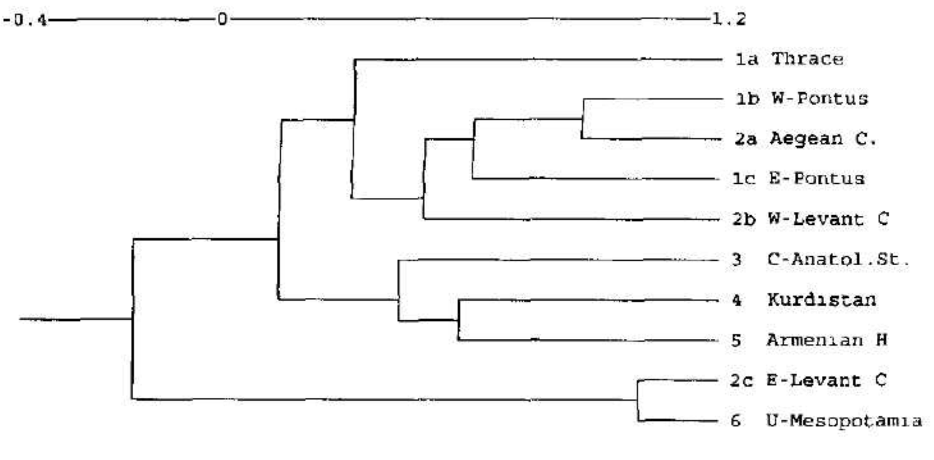

Fig 29 Results of UPGMA cluster analysis on correlations among biogeographic units based on the data summarized in Tab 1 (see also Fig. 3)

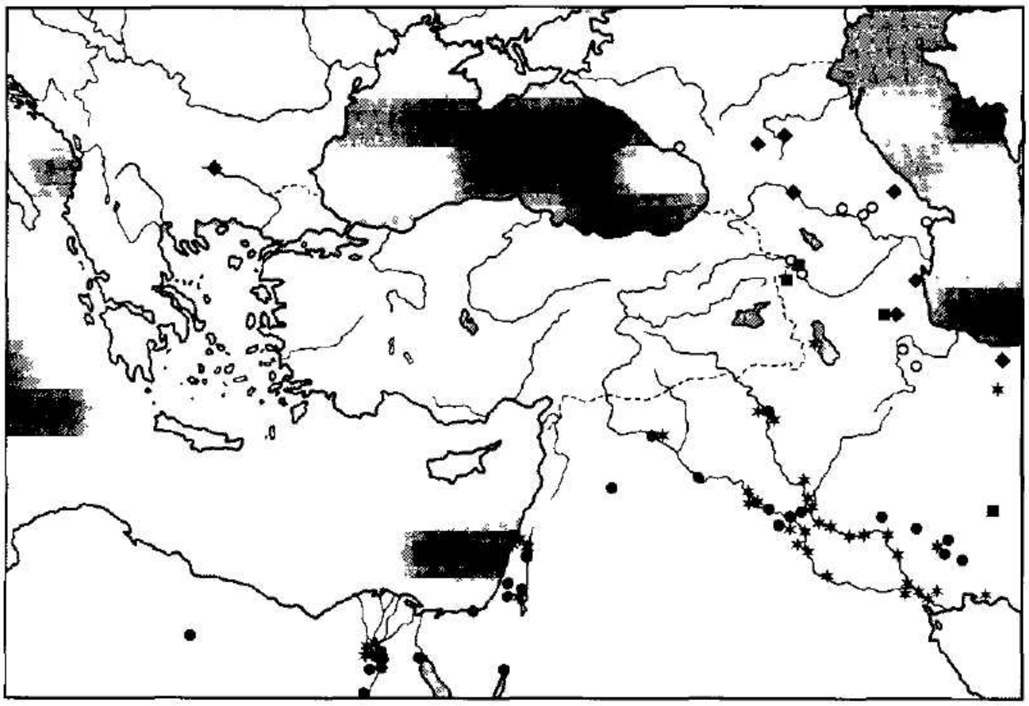

Fig. 30. Map of Turkey and surrounding regions of the Eastern Mediterranean with records of some bat species that may come in account for Turkish fauna: *Taphozous nudiventris* (✱), *Asellia tridens* (●), *Myotis schaubi* (■), *Eptesicus nilssonii* (◆), and *E. bottae ognevi* (○). Records after DeBlase (1980), Hanák & Horáček (1986), Harrison & Bates (1991), Horáček & Hanák (1984), Ilyin et al. (1998), Nader & Kock (1990), Qumsiyeh (1985), and Vereščagin (1959), and our own data.

the Eastern Pontus, close to Transcaucasia. As well in the case of the former group as with Pontus the most characteristic feature is a considerable representation of the elements of the European Boreal type (cf. Tab 1).

The analysis confirmed that the major difference in faunal structure are between the Northwestern and the Southeastern Turkey: the territory of the Upper Mesopotamia and Hatay is either poor in the boreal elements and it contains the forms that do not appear in any other regions (namely those representing a group of Saharo-Sindian Desert Mammals in sense of Harrison 1964). The Central and Eastern Anatolian plateau are inhabited by the transient type of fauna, that neither can be coidentified with the Boreal pattern of the Nortwestern region nor with the afro-eremial aspects of the Southeastern zone. It is relativelly poor, and in contrast with both the other major groups, without any forms that would be exclusive just for this region. Worth mentioning is, that in more species it seems possible to correlate the borderlines between the above mentined major zoogeographic regions with the transitional zones among phenotypically different populations (that may be considered as different subspecies, eventually). The following taxa may serve as examples: *R. ferrumequinum* (*R. f. ferrumequinum* in the west, *R. f. irani* in the east), *M. myotis* (*M. m. myotis* and *M. m. macrocephalicus*), *M. blythii* (*M. b. oxygnathus* and *M. b. omari*), *M. nattereri* (*M. n. nattereri* and *M. n. tschuliensis*), *M. emarginatus* (*M. e. emarginatus* and *M. e. turcomanicus*), *Hypsugo savii* (*H. s. savii* and *H. s. caucasicus*), *Miniopterus schreibersii* (*M. s. schreibersii* and *M. s. pallidus*) and probably it may concern also the other species. Another type of geographic variation, the difference between the North-Turkish populations (so Pontic) and the South-Turkish populations (Taurus Mts.) probably exists in bats of the genus *Eptesicus*. The northern part of Turkey is inhabited by *E. serotinus serotinus*, the southern parts by *E. s. shiraziensis*, or some other subspecies. Similarly, in contrast to *E. bottae anatolicus*, another subspecies, *E. b. ognevi*, inhabits Transcaucasia and probably also the Northeastern Turkey. In respect to the categorial-like shifts in geographic variation in all the above mentioned species, the most significant transitional zone is apparently that which connects the Cilician coast, the northern margins of the Mesopotamia and the Van region, in Turkey.

As demonstrated earlier (Benda & Horáček 1995a), and as indicated by the above results, it is particularly just the region of Eastern Turkey that represents the most significant intergradation zone between different faunal and taxonomical units which apparently had to respond to different ecological and historical condition. In other words, it seems symptomatical that the region of Kurdistan is a hot spot not only in ethnical, political, cultural or geological contextes but, apparently, also as the faunal history and phylogenetic dynamics are concerned. Just that region can be looked upon as an organization knot by which the faunal history of the Eastern Mediterranean has always been modified, and in general it concerns the territory of Turkey at all. Already the excitating fact that 22 of 31 species composing theTurkish bat fauna reach here margins of their distribution illustrates quite a well that just the territory of Turkey represents one of the most important border zone within the whole Western Palearctic. Last but not least, as shown above, the region of the Middle East and the Turkish territory is of a crucial significance also for comprehension to taxonomy, phylogentic dynamics and classification of more chiropteran species and/or species groups. Just here do arise as urgent problems the questions of species content of the groups which in other regions look like seemingly monotypic taxa. In particular this concerns of *Myotis mystacinus*-group, bats of the genus *Plecotus* and *Barbastella*, and, at the level of itraspecific variation, also *Eptesicus* spp., *Rhinolophus hipposideros*, *Myotis emarginatus*, *Pipistrellus pipistrellus*, *P. kuhlii*, *Otonycteris hemprichi*, *Miniopterus schreibersii*, *Tadarida teniotis* and probably some others. All these topics call for a profound analyses which results could largerly extent current understanding not only to the chiropteran taxonomy but to general patterns of phylogenetic and distributional dynamic in the region where the geological, climatic and environmental history have, for more than ten thousands years, continuously combined with a multisided impact of human civilisation.

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APPENDIX – GAZETTEER

1 Edirne more localities in town and neigbourhood (Edirne) (41° 39' N, 26° 33' E) – **2** Sarpdere (Kırklareli), Dupnısa magarası cave (41° 51' N, 27° 33' E) and Kız magarası cave (41° 50' N, 27° 34' E) – **3** Igneada, Longoz (Kırklareli) (41° 52' N, 27° 56' E) – **4** Kıyıkoy (Kırklareli) (41° 37' N, 28° 5' E) – **5** Safe suyu spring (3 km NW Sergen) (Kırklareli) (41° 42' N, 27° 41' E) – **6** Velika Koprusu bridge (n Demirkoy) (Kırklareli) (41° 45' N, 27° 44' E) – **7** Istanbul, near hippodrome (Istanbul) (41° 1' N, 28° 57' E) – **8** Gokçeada Island (Çanakkale) (40° 10' N, 25° 52' E) – **9** Yalova (Çanakkale) (40° 15' N, 26° 24' E) – **10** Bergama (Izmir) (39° 7' N, 27° 11' E) – **11** Uludag (Bursa) (40° 4' N, 29° 10' E) – **12** Yalova (Termal) Kaplıca (Istanbul) (40° 37' N, 29° 13' E) – **13** Sımıla (Istanbul) (40° 40' N, 29° 21' E) and Yalova (Istanbul) (40° 39' N, 29° 16' E) – **14** Altınova (Kocaeli)

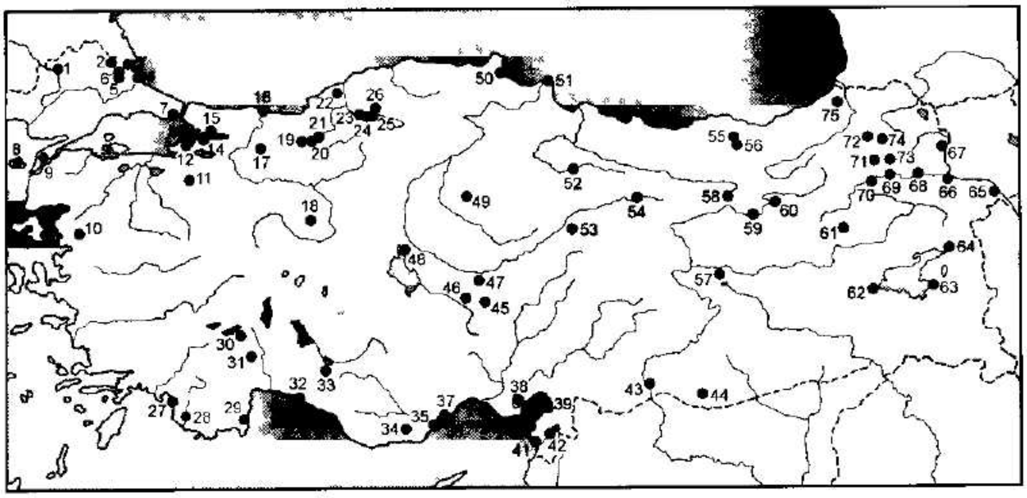

Fig 31 Original record localities mentioned in the text, for locality numbers see gazetteer

(40° 42' N, 29° 32' E) and Fevziye (n Altınova) (Kocaeli) (40° 40' N, 29° 31' E) – **15** Hereke (Kocaeli) (40° 46' N, 29° 37' E) **16** Denizkoy (Sakarya) (41° 8' N, 30° 35' E) – **17** Hanyatak (Sakarya) (40° 33' N, 30° 38' E) – **18** a rocky massiff 10 km NE of Sivrihisar (Eskişehir) (39° 31' N, 31° 39' E) – **19** Abant Golu lake (Bolu) (40° 38' N, 31° 16' E) – **20** Çepni (Bolu) (40° 39' N, 31° 31' E) – **21** Bolu (Bolu) (40° 45' N, 31° 37' E) – **22** Çayır, Çayırkoy magarası cave (Zonguldak) (41° 27' N, 32° 0' E) – **23** Yenice (Zonguldak), village (41° 11' N, 32° 19' E) and a large cave n railway (41° 13' N, 32° 20' E) – **24** Yalnızca (Zonguldak) (41° 9' N, 32° 33' E) – **25** Karabuk (Zonguldak) (41° 12' N, 32° 38' E) – **26** Safranbolu, Mencilar (= Mencilis) magarası cave (Zonguldak) (41° 17' N, 32° 41' E) **27** Kaya (n Fethiye) (Mugla) (36° 35' N, 29° 5' E) – **28** Kınık (Antalya) (36° 21' N, 29° 20' E) – **29** Olympos (Antalya) (36° 25' N, 30° 29' E) – **30** Taşkapı, Insuyu magarası cave (Burdur) (37° 41' N, 30° 24' E) – **31** Bucak, Susuz Han (Burdur) (37° 24' N, 30° 33' E) – **32** Sahil (Antalya) (36° 47' N, 31° 25' E) – **33** Tınaztepe magarası caves (n Bozkır) (Konya) (37° 14' N, 32° 01' E) – **34** Bozagaç, Yalan Dunya magarası cave (Içel) (36° 18' N, 33° 25' E) – **35** Silifke, Castle of Silifke (Içel) (36° 24' N, 33° 57' E) – **36** Narlıkuyu (Içel) (36° 27' N, 34° 7' E) – **37** Narlıkuyu, Cennet and Cehennem caves (Içel) (36° 29' N, 34° 8' E) – **38** Deveciuşagı (Adana) (36° 47' N, 35° 38' E) – **39** Iskenderun (Hatay) (36° 36' N, 36° 10' E) – **40** Konacık (Hatay) (36° 19' N, 35° 49' E) – **41** Çevlik (Hatay) (36° 9' N, 35° 56' E) – **42** Antakya (Hatay) (36° 15' N, 36° 08' E) **43** Birecik (Şanlı Urfa) (37° 3' N, 37° 59' E) **44** Harran (= Altınbaşak) (Şanlı Urfa) (36° 51' N, 39° 2' E) **45** Akkoy (Kayseri) (38° 22' N, 35° 04' E) – **46** Herala, Nargolu (Nigde) (38° 23' N, 34° 29' E) – **47** Goreme (Nevşehir) (38° 40' N, 34° 50' E) – **48** Kurutlutepe (Ankara) (38° 34' N, 33° 27' E) **49** Hattuşaş (Çorum) (40° 1' N, 34° 38' E) – **50** Yalıkoy–Kabalı (Sinop) (41° 52' N, 35° 6' E) **51** Kurtler (Samsun) (41° 42' N, 36° 1' E) – **52** Castle of Tokat (Tokat) (40° 19' N, 36° 33' E) **53** Gucuk (n Şarkışla) (Sivas) (39° 27' N, 36° 33' E) – **54** Zara, Demiryurt (Sivas) (39° 55' N, 37° 45' E) – **55** a cave 6 km SW Maçka (Trabzon) (40° 47' N, 39° 35' E) – **56** Sumelas (Trabzon) (40° 42' N, 39° 40' E) – **57** Harput, Buzluk magarası cave (Elazig) (38° 43' N, 39° 16' E) – **58** Guzyurdu, a mountain pass 2300 m (Gumuşhane) (39° 54' N, 39° 34' E) – **59** blind tunnel n Derebuk (Tunceli) (39° 35' N, 39° 55' E) – **60** Tercan (Erzincan) (39°17' N, 40° 22' E) – **61** Hinis (Erzurum) (39° 21' N, 41° 42' E) – **62** Alaman Han (Bitlis) (38° 28' N, 42° 12' E) – **63** Castle of Van (Van) (38° 30' N, 43° 20' E) – **64** Muradiye cave (Van) (39° 2' N, 43° 44' E) – **65** Aralık (Kars) (39° 52' N, 44° 31' E) – **66** Tuzluca (Kars) (40° 3' N, 43° 40' E) **67** Anı, ruins of Armenian town (Kars) (40° 31' N, 43° 34' E) – **68** Kagızman (Kars) (40° 10' N, 43° 08' E) **69** Bogakale (Kars) (40° 8' N, 42° 29' E) **70** Horasan (Erzurum) (40° 3' N, 42° 10' E) – **71** tunnel 5 km N of Sırbasan (Kars) (40° 19' N, 42° 20' E) – **72** ruins of a castle near Koprubaşı (Erzurum) (40° 42' N, 42° 11' E) – **73** tunnel 5 km W of Sarıkamış (Kars) (40° 19' N, 42° 33' E) – **74** canyon 10 km SW of Aydogdu (Erzurum) (40° 40' N, 42° 25' E) **75** Murgul, Damar village (Artvin) (41° 15' N, 41° 35' E)

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BOOK REVIEW

WOJCIK J M & WOLSAN M (eds) 1998 **Evolution of Shrews** Bialowieza Mammal Research Institute PAS, 458 pp

During last ten years, biology and evolution of shrews has been adressed with an increasing amount of contributions including even the extensive volumes such as the proceedings of special symposia devoted just to shrew topics (Hanski et al 1989, Hausser 1991, Zima et al 1994, Fredga & Searle 1996), in particular that of the symposium "Advances in the Biology of Shrews" (Merritt et al 1994) All this demonstrated shrews as a group extremely attractive from ecological, phylogenetic and evolutionary points of view that, moreover, provides nearly an ideal model also for study general aspects of these subjects Nevertheless, though demonstrated actual content of the matter, no of these volumes provided an overall review of shrew topics that would respond as well a need of a comprehensive summary of current state of knowledge respecting the whole of the primary evidence and topical extensions of shrew topics as a need of a reliable introduction of the group as a phylogenetic unit to everyone whome it may concern

The editors of "Evolution of Shrews" decided to respond just these claims The book was published in the Mammal Research Institute PAS in Bialowieza, founded by the pioneer of modern research in shrew biology, the late August Dehnel, a laboratory in which shrews have continuously been studied for half a century, last but not least thanks to its past director, Professor Zdzislaw Pucek to whome the book is dedicated The book is composed of 13 chapters written by 21 authors, mostly the leading specialists of the topics About one third of the book is devoted to fossil record of the group, the other third to the chromosomal evolution and/or to biochemical and molecular approaches to the topic, the remaing third deals with evolution of energetic strategies, social and mating systems The book is supplemented with an appendix providing a list of living shrew species (by M Wolsan and R Hutterer) and a detailed Taxonomic index

The Chapter 1 (A Classification of the Fossil and Recent Shrews) by Jelle W F Reumer provides a brief survey of major classifications of the group (unfortunately without quoting e g those by Van Valen (1967) and Gureev (1979) by which also some generic taxa has not been included here – e g *Nectogalinia* Gureev, 1979), establishes in short but in quite an excellent way diagnostic characters of major clades, and last but not least proposes a revised scheme of suprageneric classification of the family The Chapter 2 (Fossil History of Shrews in Europe) by B Rzebik-Kowalska provides in almost 50 pages nearly a complete list of European fossil records reported for all the named species, summarized into a brief account of faunal evolution The reader may would appreciated here a more detailed evaluation (major shifts in faunal structure, anagenetic trends in particular clades, phylogenetic inferences of the fossil record etc) but it apparently was not the major goal of this, otherwise quite excellent, survey Fossil history of shrews is concerned also within next three chapters summarizing it for Asia (G Storch, Z Qiu, V S Zazhigin), Africa (P M Butler) and North America (A H Harris) Chapter 6 "Dental Adaptation in Shrews" by E Dannelid gives a detailed description of dental specificities in major part of shrew genera Unfortunately, this is the only chapter devoted to morphology, and neither it analyses functional aspects and evolutionary consequences related to the major apomorphy of the clade, the bicondylous mandibular joint

The chapters 7 and 8 deal with chromosomal evolution in shrews The former one by J Zima, L Lukačova and M Macholan surveys all the data available for the family of Soricidae and analyses the chromosomal specificities in particular species groups, the latter one (J B Searle, J M Wojcik) discusses in details the case of *Sorex araneus*, i e the topic just by which shrews became a top model for study of hybridisation dynamics and microevolutionary processes The following two chapters (9 Protein Evolution by M Ruedi, 10 Mitochondrial DNA Evolution by J Hausser, L Fumagalli and P Taberlet) supplement that topic with further background dimensions by which the picture of evolutionary dynamics of shrews is getting even more plastic

Chapter 11 by J R E Taylor (Evolution of Energetic Strategies) concerns general aspects of ecological physiology, optimisation of energetic budget under natural conditions and/or cost of reproductions The next chapter (12 Evolution of Social System) by L Rychlik, provides on almost 50 pages a very comprehensive survey of social organisation and spatial structure of shrew populations during life cycle, distinguishes four major types of social system and discusses aspects of their evolution The last chapter of the volume (by P Stockles and J B Searle) briefly summarizes data on Mating System and related dynamics of reproduction strategies The book is undoubtedly the most comprehensive monograph concerning shrews that ever appeared Everyone who is interested in up to day information on that topics will be entirelly safisfied not only from complexity of individual review articles but also from extraordinary rich information on primary sources The reference sections of the book cover more than 82 pages with about 1650 references, there is a number of tabelary surveys of primary data for each taxon such as the karyotype characteristics, metabolic parameters, data on social organisation, lists of fossil records etc The only what a reader may miss is a general summary – a chapter explaining in short what it is a shrew, what does make that clade a well defined evolutionary unit, which have been the essential qualities and constitutional constraints establishing it and what designed the specific patterns of its phylogenetic strategy and its prospect in actual communities Anyhow, already in this, the book opens the perspectives for further research and with its extraordinary qualities it has provided to it a very reliable platform

To the editors of the book as well as to all its authors I wish to express my sincere congratulations

Ivan Horaček

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Lectotype designations in the Palaearctic and Oriental *Agrilus* species (Coleoptera: Buprestidae) of the Oberthür's collection in the Muséum national d'Histoire naturelle, Paris

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Abstract. List of type material of the Palaearctic and Oriental *Agrilus* Curtis, 1825 species in the collection of Rene Oberthur, Museum national d'Histoire naturelle, Paris is provided. Lectotypes from Deyrolle, Eschscholtz, Fairmaire, Gebler, Gory, Gory et Laporte and Marseul type material are designated.

Lectotype designation, Coleoptera, Buprestidae, *Agrilus*, Palaearctic region, Oriental region

INTRODUCTION

During a study of the type material of the genus *Agrilus* Curtis, 1825 in Muséum national d'Histoire naturelle in Paris I also took an opportunity to examine material in the collection of René Oberthur. This collection comprises besides complete type material of all Oriental *Agrilus* species described by Deyrolle, moreover several Oriental and Palaearctic types of Eschscholtz, Fairmaire, Gebler, Gory, Gory et Laporte and Marseul as well. The state of collection however, disallowed any handling with material. A major part of material was unlabelled except for a separate label, attached on the bottom of the box on the left side of a specimen or specimens. Into the collection have been added successively and inconsistently further specimens untill the boxes were fully stuffed. Handling the material was complicated by corroded pins firmly fixed in the bottom of the box. Serious examination of the type material was impossible in the given conditions. Due to the kindness of J.-J. Menier I was allowed to perform several modifications in the Palaearctic and Oriental part of the genus *Agrilus* of the Oberthur's collection.

MATERIAL AND METHODS

All specimens originally stored in two boxes were placed into new boxes and provided with yellow printed labels "*MUSEUM PARIS 1952 COLL. R. OBERTHUR*". The successively included, non-type material was placed in a separate box. The original material was replaced along with corresponding labels and ordered as in the original boxes. The data from corresponding labels attached originally on the bottom of the box were rewritten by hand with black ink on the pre printed label with the inscription "TRANSCRIPTIO" in black border and attached to each specimen. The type material was finally labelled with red printed labels as follows: "LECTOTYPE" or "PARALECTOTYPE" or "HOLOTYPE by monotypy", followed with unabbreviated species name (in original *combination and original spelling), author or authors name, year of the publication and inscription* "E. Jendek design. 1997".

Present paper represents list of type material of the Palaearctic and Oriental *Agrilus* species stored in the Oberthur's collection. The list includes formal designation of lectotypes and number of paralectotypes (if exist). The first line gives the available correctly spelled species name in recent generic combination, despite it is valid or not, followed by author and year of publication. Synonymy of a single species is not given as exceed scope of this work The second line gives the name in original spelling and original combination with its author, year of publication and pages The rest of the data cover information accompanying type material, eventually author's remarks or comments

The following abbreviations and marks are used quotation " ", mean data from literature are listed square brackets [ ] are used for author's remarks and complementation, backslash \ is used to separate data from different labels, [p] preceding data printed, [h] preceding data hand-written

LIST OF SPECIES

Agrilus adonis Deyrolle, 1864

A[grilus] *Adonis* Deyrolle, 1864 139, 171–172

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Adonis Deyr Singapoor [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus aeneipennis Deyrolle, 1864

A[grilus] *Aeneipennis* Deyrolle, 1864 141, 181–182

Lectotype, by present designation, male "Ceram [h]" Paralectotype, 1 specimen, sex not examined "Amboine [h]" Number of syntypes unknown, but more specimens are indicated by male and female characters listed in original description

Agrilus aeneolus Deyrolle, 1864

A[grilus] *Aeneolus* Deyrolle, 1864 145, 197

Lectotype, by present designation, sex not examined "Florès [h]" Paralectotype, 1 specimen, sex not examined "TRANSCRIPTIO [p] Aeneolus HDeyr Ceram, Florès [h]" Number of syntypes unknown

Agrilus aeneomaculatus Deyrolle, 1864

A[grilus] *Aeneo-maculatus* Deyrolle, 1864 140, 177

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Aeneo-maculatus HDeyr Flores [h]" Number of syntypes unknown

Agrilus agrestis Deyrolle, 1864

A[grilus] *Agrestis* Deyrolle, 1864 147, 206–207

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Agrestis Deyr Bornéo [h]" Number of syntypes unknown

Agrilus albogaster Deyrolle, 1864

A[grilus] *Albogaster* Deyrolle, 1864 140, 175–176

Lectotype, by present designation, sex not examined "Singapor [h]" Paralectotypes, 2 specimens, sex not examined "TRANSCRIPTIO [p] Albogaster HDeyr Bornéo, Singapoor [h]" Number of syntypes unknown

Agrilus albogularis Gory, 1841

Agrilus Albogularis Gory, 1841 235–236

Lectotype, by present designation, sex not examined "Type Gory [h] \ TRANSCRIPTIO [p] Albogularis Friw Typ Gory Hongrie [h]" Number of syntypes unknown

Agrilus albogularis v. *gallii* Marseul, 1866

[Agrilus albogularis] Var *Gallii* Marseul, 1866 482

Lectotype, by present designation, sex not examined "var Gallii Dej Autriche [h]" Number of syntypes unknown

Agrilus albolatus Deyrolle, 1864

A[grilus] *Albolatus* Deyrolle, 1864 145, 195

Lectotype, by present designation, male "TRANSCRIPTIO [p] Albolatus HDeyr Singapoor [h]" Paralectotype, 1 male, labelled as lectotype Number of syntypes unknown

Agrilus albopunctatus Deyrolle, 1864

A[grilus] *Albo-punctatus* Deyrolle, 1864 139, 166

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Albopunctatus HDeyr Singapoor [h]" Number of syntypes unknown

Agrilus amabilis Gory et Laporte, 1837

Agrilus Amabilis Gory et Laporte, 1837 52–53

Lectotype, by present designation, male "TRANSCRIPTIO [p] var Amabilis Gory Typ Saxe [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus amethysticollis Deyrolle, 1864

[Agrilus] *Amethisticollis* Deyrolle, 1864 144, *A*[grilus] *Amethysticollis* Deyrolle, 1864 192, (multiple original spelling)

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Amethysticollis HDeyr N Guinee [h]" Number of syntypes unknown

Agrilus amicus Deyrolle, 1864

A[grilus] *Amicus* Deyrolle, 1864 138, 161

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Amicus Deyr Singapoor [h]" Number of syntypes unknown

Agrilus anthracinus Deyrolle, 1864

A[grilus] *Anthracinus* Deyrolle, 1864 142, 186

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Anthracinus HDeyr Mysole [h]" Number of syntypes unknown

Agrilus ascanius Deyrolle, 1864

A[grilus] *Ascanius* Deyrolle, 1864 138, 159

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Ascanius HDeyr Ceram [h]" Number of syntypes unknown

Agrilus asperrimus Marseul, 1866

[Agrilus] *Asperrimus* Marseul, 1866 437, 492–493

Lectotype, by present designation, sex not examined "Asperrimus (Laferte) type Marse[ul] Italie [h]"

Agrilus aubei Gory et Laporte, 1837

Agrilus Aubei Gory et Laporte, 1837 44–45

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] var Aubei Gory Type Paris [h]" Paralectotypes, 2 specimens, one without abdomen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus auratus Deyrolle, 1864

A[grilus] *Auratus* Deyrolle 1864 147, 209–210

Lectotype, by present designation, male "TRANSCRIPTIO [p] Auratus HDeyr Borneo [h]" Number of syntypes unknown

Type locality. Bornéo (corrected statement of the type locality)
Remarks Deyrolle's (1864) statement of type locality "I Arrow" differs from that on lectotype's label.

Agrilus auripennis Gory et Laporte, 1837

Agrilus Auripennis Gory et Laporte, 1837 46–47

Holotype by monotypy, sex not examined "TRANSCRIPTIO [p] Auripennis Gory Type France mer [h]"

Agrilus auripes Deyrolle, 1864

A[grilus] *Auripes* Deyrolle, 1864 141, 180

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Auripes HDeyr Mysole [h]" Number of syntypes unknown

Agrilus auripilis Deyrolle, 1864

A[grilus] *Auripilis* Deyrolle, 1864 139, 167

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Auripilis HDeyr Borneo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus bihamatus Deyrolle, 1864

A[grilus] *Bihamatus* Deyrolle, 1864 143, 189–190

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Bihamatus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus campestris Deyrolle, 1864

A[grilus] *Campestris* Deyrolle, 1864 147, 205–206

Lectotype, by present designation, sex not examined "Ceram [h]" Paralectotype, 1 specimen, sex not examined "Amboine [h]" Number of syntypes unknown

Agrilus capitatus Deyrolle, 1864

A[grilus] *Capitatus* Deyrolle, 1864 141, 179

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Capitatus HDeyr Singapoor [h]". Number of syntypes unknown.

Agrilus carbonarius **Deyrolle, 1864**

A[grilus] *Carbonarius* Deyrolle, 1864: 143, 188–189.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Carbonarius Deyr. Céram [h]". Number of syntypes unknown.

Agrilus celebiensis **Deyrolle, 1864**

A[grilus] *Celebiensis* Deyrolle, 1864: 140, 175.

Lectotype, by present designation, male: "Makassar [h]". Paralectotype, 1 specimen, sex not examined: "TRANSCRIPTIO [p] Celebiensis HDeyr Célèbes [h]". Number of syntypes unknown.

Agrilus chalybeus **Deyrolle, 1864**

A[grilus]. *Chalybeus* Deyrolle, 1864: 144, 193–194.

Lectotype, by present designation, sex not examined: "Mysole [h]". Paralectotype, 1 specimen, sex not examined: "TRANSCRIPTIO [p] Chalybeus HDeyr N. Guinée Mysole [h]". Number of syntypes unknown.

Agrilus chrysicollis **Deyrolle, 1864**

A[grilus] *Chrysicollis* Deyrolle, 1864: 136, 148–149.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Chrysicollis HDeyr Batchian [h]". Paralectotypes, 3 specimens, sex not examined, labelled as lectotype. Number of syntypes unknown.

Agrilus chrysochloris **Deyrolle, 1864**

A[grilus] *Chrysochloris* Deyrolle, 1864: 146, 200–201.

Lectotype, by present designation, male: "TRANSCRIPTIO [p] Chrysochloris HDeyr Bourou [h]". Paralectotype, 1 specimen, sex not examined, labelled as lectotype. Number of syntypes unknown.

Agrilus ciliatipes **Deyrolle, 1864**

A[grilus] *Ciliatipes* Deyrolle, 1864: 139, 170.

Lectotype, by present designation, male: "TRANSCRIPTIO [p] Ciliatipes HDeyr Singapoor [h]". Number of syntypes unknown.

Agrilus coelestis **Deyrolle, 1864**

A[grilus] *Coelestis* Deyrolle, 1864: 137, 156–157.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Coelestis HDeyr Florès [h]". Paralectotypes, sex not examined, 2 specimens labelled as lectotype, 1 specimen: "Flores [p]". Number of syntypes unknown.

Agrilus concavus **Deyrolle, 1864**

A[grilus] *Concavus* Deyrolle, 1864: 146, 203.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Concavus HDeyr N Guinée [h]" Number of syntypes unknown

Agrilus cuneiformis Deyrolle, 1864

A[grilus] *Cuneiformis* Deyrolle, 1864. 143, 187–188

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Cuneiformis HDeyr Mysole [h]" Number of syntypes unknown.

Agrilus cupreoviolaceus Deyrolle, 1864

A[grilus]. *Cupreo-violaceus* Deyrolle, 1864. 139, 169

Lectotype, by present designation, sex not examined. "N. Guinee [h]" Paralectotypes, sex not examined, 1 ex "Mysole", 1 ex. "TRANSCRIPTIO [p] Cupreo-violaceus HDeyr. N. Guinée Mys. Morty [h]" Number of syntypes unknown.

Agrilus cuprifrons Deyrolle, 1864

A[grilus] *Cuprifrons* Deyrolle, 1864 138, 159–160

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Cuprifrons HDeyr. Célèbes Menado [h]" Number of syntypes unknown.

Agrilus cupripes Deyrolle, 1864

A[grilus]. *Cupripes* Deyrolle, 1864 136, 149–150.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Cupripes HDeyr Céram [h]". Number of syntypes unknown

Agrilus cyanicollis Deyrolle, 1864

A[grilus]. *Cyanicollis* Deyrolle, 1864 140, 174–175

Lectotype, by present designation, sex not examined. "Morty [h]". Paralectotype, 1 specimen, sex not examined. "TRANSCRIPTIO [p] Cyanicollis HDeyr. Batchian Morty [h]". Number of syntypes unknown.

Agrilus cyanipennis Gory et Laporte, 1837

Agrilus Cyanipennis. Gory et Laporte, 1837: 18

Lectotype, by present designation, sex not examined. "Cyanipennis Gory type Inde [h] \ Kerremans Vidit 1892 [p] \ Ex-Musaeo Mniszech [p]". Number of syntypes unknown.

Agrilus dentipes Deyrolle, 1864

A[grilus]. *Dentipes* Deyrolle, 1864: 137, 153

Lectotype, by present designation, sex not examined: "Batchian [h]". Paralectotype, 1 specimen, sex not examined. "Waigiou [h]". Number of syntypes unknown.

Agrilus diadema Deyrolle, 1864

A[grilus] *Diadema* Deyrolle, 1864: 138, 163

Lectotype, by present designation, sex not examined, abdomen missing "TRANSCRIPTIO [p] Diadema HDeyr Borneo [h]" Number of syntypes unknown

Agrilus discicollis Deyrolle, 1864

A[grilus] *Discicollis* Deyrolle, 1864 143, 189

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Discicollis HDeyr Borneo [h]" Number of syntypes unknown

Agrilus distinctus Deyrolle, 1864

A[grilus] *Distinctus* Deyrolle, 1864 146, 200

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Distinctus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus distinguendus Gory et Laporte, 1837

Agrilus Distinguendus Gory et Laporte, 1837 44

Lectotype, by present designation, sex not examined "male [h] \ TRANSCRIPTIO [p] var Distinguendus Gory Type Paris France m [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus dorsalis Deyrolle, 1864

A[grilus] *Dorsalis* Deyrolle, 1864 141, 180–181

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Dorsalis HDeyr Mysole [h]" Number of syntypes unknown

Agrilus ecarinatus Marseul, 1866

[Agrilus] *Ecarinatus* Marseul, 1866 439, 484–485

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Ecarinatus Mars Type Siberie or [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus elongatus Deyrolle, 1864

A[grilus] *Elongatus* Deyrolle, 1864 136, 151–152

Lectotype, by present designation, male "N Guinee [h]" Paralectotypes, 1 female "Waigiou [h]", 1 female "Arrow [h]" Number of syntypes unknown

Agrilus evinadus Gory et Laporte, 1837

Agrilus Evinadus Gory et Laporte, 1837 30

Lectotype, sex not examined "TRANSCRIPTIO [p] Evanidus [sic!] (Dej) Inde Java [h] \ Lectotype d'Agrilus evinadus C G A Descarpentries et [h] A Villiers det 19 [p] 62 [h]" Paralectotype, 1 male without head "TRANSCRIPTIO [p] Evanidus [sic!] (Dej) Inde Java [h]" Number of syntypes unknown

REMARKS. Lectotype designated and type locality corrected by Descarpentries & Villiers (1963)

Agrilus faldermanni Gory et Laporte, 1837

Agrilus Faldermanni Gory et Laporte, 1837. 42 43

Lectotype, by present designation, male: "TRANSCRIPTIO [p] Mendax Mannerh Faldermanni C. Gory typ Russie [h]". Paralectotypes, 3 specimens, sex not examined, labelled as lectotype. Number of syntypes unknown

Agrilus frater Deyrolle, 1864

A[grilus] *Frater* Deyrolle, 1864 137, 155–156.

Holotype by monotypy, sex not examined. "TRANSCRIPTIO [p] Frater HDeyr Makian [h]"

Agrilus funebris Deyrolle, 1864

A[grilus] *Funebris* Deyrolle, 1864 143, 188

Lectotype, by present designation, male: "TRANSCRIPTIO [p] Funebris HDeyr N. Guinée Arrow [h]" Paralectotype, 1 specimen, sex not examined "Dorey [h] \ TRANSCRIPTIO [p] Funebris HDeyr N Guinée Arrow [h]". Number of syntypes unknown, but more specimens are indicated by male and female characters listed in original description

Agrilus gentilis Deyrolle, 1864

A[grilus] *Gentilis* Deyrolle, 1864 142, 185–186.

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Gentilis HDeyr. Bornéo [h]" Number of syntypes unknown

Agrilus gracilis Deyrolle, 1864

A[grilus] *Gracilis* Deyrolle, 1864. 145, 197–198

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Gracilis HDeyr. Makian [h]". Number of syntypes unknown

Agrilus graminis Gory et Laporte, 1837

Agrilus Graminis Gory et Laporte, 1837 51

Lectotype, by present designation, male "TRANSCRIPTIO [p] Graminis Gory Type non Panz Illyric [h]" Paralectotypes, 1 male, 1 female, labelled as lectotype Number of syntypes unknown.

REMARKS. Gory et Laporte (1837) in their work missidentified *Buprestis graminis* Panzer, 1799 with a new species and they simultaneously used first time the combination of the specific epiteton *graminis* with the generic name *Agrilus*. *Buprestis graminis* Panzer reffers recently to *Meliboeus graminis* (Panzer) and has nothing in common with *Agrilus graminis* Panzer sensu Gory et Laporte. According to the rules of ICZN (1985), Article 49 such a name must be replaced. Nevertheless *Agrilus graminis* Panzer sensu Gory et Laporte represents good, generally accepted and common species, with authorship given to Gory et Laporte, therefore this nomenclatorical problem should be solved by the Commission.

Agrilus gratiosus Deyrolle, 1864

A[grilus] *Gratiosus* Deyrolle, 1864 146, 202–203

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Gratiosus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus grisescens Deyrolle, 1864

A[grilus] *Grisescens* Deyrolle, 1864 142, 184–185

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Grisescens HDeyr Makian [h]" Number of syntypes unknown

Agrilus guttulatus Deyrolle, 1864

A[grilus] *Guttulatus* Deyrolle, 1864 143, 190

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Guttulatus HDeyr Batchian [h]" Number of syntypes unknown

Agrilus hirsutulus Deyrolle, 1864

A[grilus] *Hirsutulus* Deyrolle, 1864 147, 210

Lectotype, by present designation, sex not examined "Batchian [h]" Paralectotype, 1 specimen, sex not examined "Waigiou [h]" Number of syntypes unknown

Agrilus hypocritus Deyrolle, 1864

A[grilus] *Hypocritus* Deyrolle, 1864 145, 198–199

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Hypocritus HDeyr Batchian [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown, but more specimens are indicated by male and female characters listed in original description

Agrilus ignicollis Deyrolle, 1864

A[grilus] *Ignicollis* Deyrolle, 1864 137, 156

Lectotype, by present designation, sex not examined "Florès [h]" Paralectotypes, sex not examined, 1 specimen "Timor [h]", 2 specimens "TRANSCRIPTIO [p] Ignicollis HDeyr Florès Timor [h]" Number of syntypes unknown

Agrilus ignifrons Deyrolle, 1864

A[grilus] *Ignifrons* Deyrolle, 1864 136, 150

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Ignifrons HDeyr Bourou [h]" Number of syntypes unknown

Agrilus impopularis Deyrolle, 1864

A[grilus] *Impopularis* Deyrolle, 1864 146, 199–200

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Impopularis HDeyr Borneo [h]" Number of syntypes unknown

Agrilus impressicollis Marseul, 1866

[Agrilus] *Impressicollis* Marseul, 1866 436, 454–455

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Impressicollis (Manh) Mars type Siberie [h] \ Agrilus foveicollis Mars 1869 = impressicollis Mars 1865 nom praeoc syntype [h] A Descarpentries det [p] \ Agrilus [p] betuleti Ratz [h] Sv Bily det [p] 1981 [h]" Paralectotype, 1 specimen, sex not examined "TRANSCRIPTIO [p] Impressicollis (Manh) Mars type Siberie [h] \ Agrilus [p] betuleti Ratz [h] Sv Bily det [p] 1981 [h]" Number of syntypes unknown

Agrilus incerticolor Deyrolle, 1864

A[grilus] *Incerticolor* Deyrolle, 1864 139, 170–171

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Incerticolor HDeyr Borneo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus incertus Deyrolle, 1864

A[grilus] *Incertus* Deyrolle, 1864 141, 182

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Incertus HDeyr Gilolo [h]" Number of syntypes unknown

Agrilus indigaceus Deyrolle, 1864

A[grilus] *Indigaceus* Deyrolle, 1864 138, 161

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Indigaceus HDeyr N Guinee [h]" Number of syntypes unknown

Agrilus indignus Fairmaire, 1849

Agrilus indignus Fairmaire, 1849 35–36

Lectotype, by present designation, sex not examined "Agrilus indignus Fairm Taiti [by Fairmaire's hand] \ indignus Fairmaire Type [by Kerremans' hand]" Paralectotype, 1 specimen, sex not examined "TRANSCRIPTIO [p] Indignus Fairmaire Taiti [h]" Number of syntypes unknown

REMARKS There are also 2 paralectotypes from Taiti preserved in the Natural History Museum, London, which I have not studied

Agrilus insipidus Deyrolle, 1864

A[grilus] *Insipidus* Deyrolle, 1864 138, 162

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Insipidus HDeyr Singapoor [h]" Number of syntypes unknown

Agrilus insularis Deyrolle, 1864

A[grilus] *Insularis* Deyrolle, 1864 140, 173

Lectotype, by present designation, male "Sumatra [h]" Paralectotypes, 1 male "Makian [h]", 1 male "Singapor [h]", 2 females "TRANSCRIPTIO [p] Insularis HDeyr Born Sumat Makian [h]" Number of syntypes unknown

Agrilus lancifer Deyrolle, 1864

A[grilus] *Lancifer* Deyrolle, 1864 139, 169–170

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Lancifer HDeyr Bornéo [h]" Number of syntypes unknown

Agrilus maculiventris Deyrolle, 1864

A[grilus] *Maculiventris* Deyrolle, 1864: 138, 158.

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Maculiventris HDeyr. Batchian [h]" Number of syntypes unknown

Agrilus marmoreus Deyrolle, 1864

A[grilus] *Marmoreus* Deyrolle, 1864: 146, 201–202

Lectotype, by present designation, sex not examined "Batchian [h]". Paralectotype, 1 specimen, sex not examined "Mysole [h]" Number of syntypes unknown.

Agrilus melanarius Deyrolle, 1864

A[grilus] *Melanarius* Deyrolle, 1864: 147, 207–208

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Melanarius HDeyr Bornéo [h]" Number of syntypes unknown

Agrilus meticulosus Deyrolle, 1864

A[grilus] *Meticulosus* Deyrolle, 1864: 142, 185.

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Meticulosus HDeyr. Makassar [h]" Number of syntypes unknown

Agrilus minor Deyrolle, 1864

A[grilus] *Minor* Deyrolle, 1864: 139, 171.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Minor HDeyr Bornéo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown.

Agrilus minos Deyrolle, 1864

A[grilus]. *Minos* Deyrolle, 1864: 139, 168

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Minos HDeyr Bornéo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown.

Agrilus minusculus Marseul, 1866

[Agrilus] *Minusculus* Marseul, 1866: 436, 493.

Lectotype, by present designation, male. "TRANSCRIPTIO [p] Minusculus Mars. type Autriche [h]". Number of syntypes unknown

Agrilus miserabilis Deyrolle, 1864

A[grilus]. *Miserabilis* Deyrolle, 1864: 144, 194

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Miserabilis HDeyr. Makian [h]" Number of syntypes unknown

Agrilus nigerrimus Deyrolle, 1864

A[grilus] *Nigerrimus* Deyrolle, 1864: 147, 204–205

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Nigerrimus HDeyr Mysole [h]". Number of syntypes unknown.

Agrilus nigroaeneus Deyrolle, 1864

A[grilus] *Nigro-aeneus* Deyrolle, 1864 140, 176

Lectotype, by present designation, male: "Waigiou [h]". Paralectotype, 1 male. "TRANSCRIPTIO [p] Nigroaeneus HDeyr Mysole Waigiou [h]". Number of syntypes unknown.

Agrilus nigrocyaneus Deyrolle, 1864

A[grilus]. *Nigro-cyaneus* Deyrolle, 1864 140, 172

Lectotype, by present designation, male: "TRANSCRIPTIO [p] Nigro-cyaneus HDeyr Bornéo [h]". Paralectotype, 1 female, labelled as lectotype. Number of syntypes unknown.

Agrilus nigroviolaceus Deyrolle, 1864

A[grilus] *Nigro-violaceus* Deyrolle, 1864. 145, 195–196

Lectotype, by present designation, male. "Arrow [h]". Paralectotype, 1 female. "Waigiou [h]". Number of syntypes unknown

Agrilus obscurus Deyrolle, 1864

A[grilus]. *Obscurus* Deyrolle, 1864 144, 193

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Obscurus HDeyr Batchian [h]". Paralectotype, 1 specimen, sex not examined, labelled as lectotype. Number of syntypes unknown.

Agrilus occipitalis (Eschscholtz, 1822)

Buprestis occipitalis Eschscholtz, 1822 79

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Occipitalis Gory Type Manille [h]". Paralectotype, 1 specimen, sex not examined, labelled as lectotype. Number of syntypes unknown.

Agrilus occipitalis Gory, 1841

Agrilus Occipitalis Gory, 1841 222–223.

The same as at *Agrilus occipitalis* (Eschscholtz, 1822).

REMARKS. Gory (1841) described new species from Eschscholtz's colection, comming from the type series of *Agrilus occipitalis* (Eschscholtz), knowing nothing about valid description of Eschscholtz (1822) under the same specific name *occipitalis*. *Agrilus occipitalis* Gory is based on the same name-bearing type as *Agrilus occipitalis* (Eschscholtz, 1822), and represents junior objective synonym of *Agrilus occipitalis* (Eschscholtz, 1822).

Agrilus ocularis Deyrolle, 1864

A[grilus] *Ocularis* Deyrolle, 1864. 141, 179.

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Ocularis HDeyr Bornéo [h]". Number of syntypes unknown.

Agrilus oedipus Deyrolle, 1864

A[grilus] *Oedipus* Deyrolle, 1864 138, 160–161

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] OEdipus HDeyr Borneo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus olympicus Deyrolle, 1864

A[grilus] *Olympicus* Deyrolle, 1864 142, 183

Lectotype, by present designation, female "TRANSCRIPTIO [p] Olympicus HDeyr Mysole [h]" Number of syntypes unknown

Agrilus ornatus Deyrolle, 1864

A[grilus] *Ornatus* Deyrolle, 1864 137, 155

Lectotype, by present designation, sex not examined "Amboine [h]" Paralectotypes, sex not examined, 1 specimen "Amboine [h]", 1 specimen "Arrow [h]", 1 specimen "Ceram [h]", 1 specimen "N Guinee [h]", 1 specimen "Makass[ar] [h]", 2 specimens "TRANSCRIPTIO [p] Ornatus HDeyr Molluques [h]" Number of syntypes unknown

Agrilus paganus Deyrolle, 1864

A[grilus] *Paganus* Deyrolle, 1864 142, 184

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Paganus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus parallelus Deyrolle, 1864

A[grilus] *Parallelus* Deyrolle, 1864 143, 191

Lectotype by present designation, sex not examined, apical part of left elytron missing "TRANSCRIPTIO [p] Parallelus HDeyr Morty [h]" Number of syntypes unknown

Agrilus parvulus Deyrolle, 1864

A[grilus] *Parvulus* Deyrolle, 1864 147, 207

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Parvulus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus pauper Deyrolle, 1864

A[grilus] *Pauper* Deyrolle, 1864 145, 198

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Pauper HDeyr Morty [h]" Number of syntypes unknown

Agrilus perniciosus Deyrolle, 1864

A[grilus] *Perniciosus* Deyrolle, 1864 145, 199

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Perniciosus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus piliventris Deyrolle, 1864

A[grilus] *Piliventris* Deyrolle, 1864 138, 157–158

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Piliventris HDeyr Borneo [h]" Number of syntypes unknown

Agrilus plebejus Deyrolle, 1864

A[grilus] *Plebejus* Deyrolle 1864 145, 196

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Plebejus HDeyr Sumatra [h]" Number of syntypes unknown

Agrilus pretiosus Deyrolle, 1864

A[grilus] *Pretiosus* Deyrolle, 1864 146, 203–204

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Pretiosus HDeyr Batchian [h]" Paralectotype,1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus puberulus Deyrolle, 1864

A[grilus] *Puberulus* Deyrolle, 1864 147, 209

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Puberulus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus punctifrons Deyrolle, 1864

A[grilus] *Punctifrons* Deyrolle, 1864 136, 149

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Punctifrons HDeyr I Mysole [h]" Number of syntypes unknown

Agrilus pupillus Deyrolle, 1864

A[grilus] *Pupillus* Deyrolle, 1864 145, 198

Lectotype, by present designation, female "TRANSCRIPTIO [p] Pupillus HDeyr Flores [h]" Number of syntypes unknown

Agrilus purpurifrons Deyrolle, 1864

A[grilus] *Purpurifrons* Deyrolle, 1864 138, 163–164

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Purpurifrons HDeyr Borneo [h]" Paralectotype 1 male, labelled as lectotype Number of syntypes unknown

Agrilus quadricolor Deyrolle, 1864

A[grilus] *Quadricolor* Deyrolle, 1864 138, 164–165

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Quadricolor HDeyr Sumatra [h]" Number of syntypes unknown

Agrilus quadripunctatus Deyrolle, 1864

A[grilus] *Quadri-punctatus* Deyrolle, 1864 139, 165–166

Lectotype, by present designation, sex not examined "Sumatra [h]" Paralectotype, 1 specimen without abdomen, sex not examined "TRANSCRIPTIO [p] Quadripunctatus HDeyr. Bornéo Sumatra [h]". Number of syntypes unknown

Agrilus quadrisignatus Marseul, 1866

[Agrilus] *4-signatus* Marseul, 1866 434, 444–445

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] 4-signatus (Manh.) Mars. Type Sibérie [h]" Number of syntypes unknown

Agrilus rectus Deyrolle, 1864

A[grilus] *Rectus* Deyrolle, 1864 136, 152.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Rectus HDeyr Amboine [h]" Number of syntypes unknown.

Agrilus rubifrons Deyrolle, 1864

A[grilus] *Rubifrons* Deyrolle, 1864 138, 164.

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Rubifrons HDeyr Bornéo [h]". Number of syntypes unknown

Agrilus scutellaris Deyrolle, 1864

A[grilus] *Scutellaris* Deyrolle, 1864 135, 148.

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Scutellaris HDeyr. Bornéo [h]" Number of syntypes unknown.

Agrilus semiaeneus Deyrolle, 1864

A[grilus] *Semi-aeneus* Deyrolle, 1864: 137, 157

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Semi-aeneus HDeyr. Bornéo [h]". Number of syntypes unknown.

Agrilus sepulchralis Deyrolle, 1864

A[grilus] *Sepulchralis* Deyrolle, 1864: 142, 186.

Lectotype, by present designation, sex not examined: "TRANSCRIPTIO [p] Sepulchralis HDeyr. Célèbes Menado [h]" Number of syntypes unknown

Agrilus sexpunctatus Deyrolle, 1864

A[grilus]. *Sex-punctatus* Deyrolle, 1864. 139, 166–167.

Lectotype, by present designation, sex not examined. "TRANSCRIPTIO [p] Sexpunctatus HDeyr. Bornéo [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown.

Agrilus spinipes Deyrolle, 1864

A[grilus] *Spinipes* Deyrolle, 1864 137, 153–154

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Spinipes HDeyr Mysole [h]" Number of syntypes unknown

Agrilus subauratus (Gebler, 1833)

B[uprestis] *subaurata* Gebler, 1833 277–278

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Subauratus Gebl Typ Siberie [h]" Paralectotype 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown, but range of length in original description indicates more syntypes

Agrilus subcornutus Deyrolle, 1864

A[grilus] *Subcornutus* Deyrolle, 1864 142, 182–183

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Subcornutus HDeyr Singapoor [h]" Number of syntypes unknown

Agrilus subtrifasciatus Deyrolle, 1864

A[grilus] *Sub-trifasciatus* Deyrolle, 1864 144, 191–192

Lectotype by present designation, male "N Guinee [h]" Paralectotype, 1 male "Mysole [h]" Number of syntypes unknown

Agrilus subvestitus Deyrolle, 1864

A[grilus] *Subvestitus* Deyrolle, 1864 136, 150

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Subvestitus HDeyr Makian [h]" Number of syntypes unknown

Agrilus suturaalba Deyrolle, 1864

A[grilus] *Sutura-alba* Deyrolle, 1864 139, 168–169

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Sutura-alba HDeyr Borneo [h]" Number of syntypes unknown

Agrilus suturalis Deyrolle, 1864

A[grilus] *Suturalis* Deyrolle, 1864 147, 205

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Suturalis HDeyr Borneo [h]" Number of syntypes unknown

Agrilus sylvestris Deyrolle, 1864

A[grilus] *Sylvestris* Deyrolle, 1864 147, 206

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Sylvestris HDeyr Mysole [h]" Number of syntypes unknown

Agrilus taciturnus Deyrolle, 1864

A[grilus] *Taciturnus* Deyrolle, 1864 141, 182

Lectotype, by present designation, sex not examined, right side of abdomen damaged "TRANSCRIPTIO [p] Taciturnus HDeyr Batchian [h]" Number of syntypes unknown

Agrilus thalassinus Deyrolle, 1864

A[grilus] *Thalassinus* Deyrolle, 1864 141, 179–180

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Thalassinus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus tricolor Deyrolle, 1864

A[grilus] *Tricolor* Deyrolle, 1864 144, 194

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Tricolor HDeyr Mysole [h]" Number of syntypes unknown

Agrilus tripartitus Deyrolle, 1864

A[grilus] *Tripartitus* Deyrolle, 1864 141, 181

Lectotype by present designation, sex not examined "TRANSCRIPTIO [p] Tripartitus HDeyr Borneo [h]" Number of syntypes unknown

Agrilus tristis Deyrolle, 1864

A[grilus] *Tristis* Deyrolle, 1864 143, 187

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Tristis HDeyr Singapoor [h]" Number of syntypes unknown

Agrilus trito Deyrolle, 1864

A[grilus] *Trito* Deyrolle, 1864 138, 162

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Trito HDeyr Singapoor [h]" Number of syntypes unknown

Agrilus tuberculiventris Deyrolle, 1864

A[grilus] *Tuberculiventris* Deyrolle, 1864 140, 173–174

Lectotype, by present designation, male "Kaiva [sic!] [h]" Paralectotype, 1 female "TRANSCRIPTIO [p] Tuberculiventris HDeyr Batchian Kaiva [sic!] [h]" Number of syntypes unknown

Agrilus turcicus Marseul, 1866

[Agrilus] *Turcicus* Marseul, 1866 467–468

Lectotype, by present designation, male "LECTOTYPUS [p] Agrilus turcicus Marseul 1865 [h] G Magnani des 19 [h] 94 [p] \ TRANSCRIPTIO [p] Turcicus type Mars Friwaldskyi (Laferté) Turquie [h]" Number of syntypes unknown

REMARKS I failed to find any publication in which such a designation has been formally made by Magnani.

Agrilus ultramarinus Deyrolle, 1864

A[grilus] *Ultramarina* Deyrolle, 1864 147, 208

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Ultramarina HDeyr Borneo, Malacca [h]" Paralectotype, 1 specimen, sex not examined, labelled as lectotype Number of syntypes unknown

Agrilus validus Deyrolle, 1864

A[grilus] *Validus* Deyrolle, 1864 144, 192–193

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Validus HDeyr Celebes Menado [h] Number of syntypes unknown

Agrilus vestitus Deyrolle, 1864

A[grilus] *Vestitus* Deyrolle, 1864 137, 154

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Vestitus HDeyr Amboine [h]" Number of syntypes unknown

Agrilus viridiaeneus Deyrolle, 1864

A[grilus] *Viridi-aeneus* Deyrolle, 1864 140, 177–178

Lectotype by present designation, sex not examined "Bourou [h]" Paralectotypes, sex not examined, 1 specimen 'Amboine [h]", 1 specimen "Céram [h]", 1 specimen "Salwatty [h]" Number of syntypes unknown

Agrilus viridipennis Gory et Laporte, 1837

Agrilus Viridipennis Gory et Laporte, 1837 45–46

Lectotype, by present designation, sex not examined "Type Gory [h] \ TRANSCRIPTIO [p] Viridis Fabr Viridipennis Gory type Paris Europe [h]" Number of syntypes unknown

Agrilus vittatus Deyrolle, 1864

A[grilus] *Vittatus* Deyrolle, 1864 136, 151

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Vittatus HDeyr Makassar [h]" Number of syntypes unknown

Agrilus vulcanus Deyrolle, 1864

A[grilus] *Vulcanus* Deyrolle, 1864 140, 178

Lectotype, by present designation, sex not examined "TRANSCRIPTIO [p] Vulcanus HDeyr Mysole [h]" Number of syntypes unknown

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BOOK REVIEW

Czech Zoological Society. The 70th Anniversary of the Foundation. Praha Czech Zoological Society, 1998 94 pp (in Czech, with English summary)

The Czech Zoological Society was founded as The Czechoslovak Zoological Society in Praha on May 7th, 1927, having been iniciated by several university teachers The first committee included 19 members with Professor F Vejdovsky as the President The purpose was to contribute to the development of zoology in Czechoslovakia of that time, to keep and improve all branches of this science, to organize lectures, courses, excursions and to convene Congresses, to edit professional publications, both periodical and not-periodical

In the course of the 70-years of its existence, the name of the Society changed several times in connection with the history of the country as follows Czech Zoological Society (1939–1945), Czechoslovak Zoological Society (1945–1952), Czechoslovak Zoological Society of the Czechoslovak Academy of Sciences (1952–1992) and, since 1992, Czech Zoological Society (after the disintegration of Czechoslovakia)

Since 1934, the Society has been editing the scientific journal *Věstnik Československe zoologicke spolecnosti* the name of which also changed several times in 1990 into *Acta Societatis Zoologicae Bohemoslovacae* and in 1992 into *Acta Societatis Zoologicae Bohemicae* Contributions on general, applied and systematic zoology were at first written in Czech and since 1990 all contributions have been written in English, French or Spain The 61st Volume of this scientific journal came out in 1997 At present, the journal is changed with 256 scientific societies and organizations in foreign countries From these scientific publications, the library of our Society has been built up to include 880 periodicals mainly of foreign origin

In the years 1927–1997 ten Presidents were successively at the head of the Society, viz F Vejdovsky (1927–1939), J Wenig (1928–1933), J Komarek (1934–1955), O Jirovec (1955–1959), E Bartoš (1959–1963), J Kramař (1963–1966) W Černy (1966–1972), J Kratochvil (1972–1990), Č Folk (1990–1993) and I Heraň (1993–1997), and all activities of the Society have been managed and administered by 22 committees the members of which were elected in plenary meetings of the Society held each three or four years

In 1927, at the time of foundation, 60 prominent zoologists, living in Bohemia, Moravia, Slovakia and also in Germany, applied for membership of the Society In 1934 100 zoologists were registered in the list of members, in 1948 131 and in 1990 even 570 zoologists were included in such lists of members At present (31 12 1997) 323 zoologists are members of the Society The members usually meet at sessions or meetings of branches (in Brno, Praha, Česke Budějovice and Ostrava) or in professional sections Since 1964 12 such professional sections were founded, viz in 1964 the section of protozoology, 1967 the section of ichthyology, 1968 the section of ornithology and the section of theriology, 1973 the section of herpetology and the section of invertebrate zoology, 1974 the section of zoological gardens and of museums, 1976 the section of ecology, 1979 the section of ethology, 1981 the section of protection of fauna, 1984 the section of soil zoology and 1990 the section of pedagogy Some of sections became independent societies, some sections ceased their activities At present two sections are working very activelly, viz the section of ichthyology and the section of soil zoology

The Society in the course of its existence organizated nine congresses 1st in 1951 in Opava, 2nd 1965 in Brno 3rd in 1970 in Poprad, 4th in 1973 in Česke Budějovice, 5th in 1976 in Brno, 6th in 1981 in Bratislava 7th in 1986 in Usti nad Labem, 8th in 1991 in Brno and 9th in 1997 in Česke Budějovice

In 1969–1997 a series of meetings called "Zoologicke dny v Brně" (The Zoological Days in Brno) took place regularly in autumn of each year with the exceptions of such years when the congress was held Members of our Society, together with members of other scientific societies and natural historical clubs, acquainted themselves with actual problems and progress of research and investigations

Since 1971 the Society has been editing, unregularly and only in Czech, the publication *Zpravy Československe (Česke) zoologicke spolecnosti* (Reports of the Czechoslovak (Czech) Zoological Society) where lectures, resolutions or contributions of zoological congresses have been published, and since 1992 also a small publication called *Informacni zpravodaj* (Information Reporter), edited in Czech, usually twice a year, where members are informed about all activities of the Society in the past year and about intended actions in the coming year

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A new parrot (Aves: Psittacidae) from the early Miocene of the Czech Republic

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Abstract. A new parrot, *Xenopsitta fejfari* gen. n. et sp. n., is described from the early Miocene (MN 3) of Merkur in the Czech Republic. It is the oldest member of the Psittacini known so far. Other taxonomic conclusions are as follows: *Archaeopsittacus verreauxii* (Milne-Edwards, 1871) from the early Miocene of France is not related to the Psittacini, and belongs in the Psittaculini. *Psittacus verreauxi* Milne-Edwards, 1870 is nomen nudum. Syntypes of *Pararallus dispar* (Milne-Edwards, 1869) from the middle Miocene of *France were identified, and it was shown, that the name cannot be applied to a parrot. A summary of the* Tertiary records of the Psittacidae is presented. In Europe, the scanty fossil record of the family is limited to the early and middle Miocene.

Taxonomy, Aves, Psittacidae, *Xenopsitta fejfari* gen. n. et sp. n., Miocene, Europe

INTRODUCTION

Parrots (family Psittacidae) are a well defined group of small to medium sized, primarily arboreal birds, which inhabit the tropics and subtropics of the whole world (Forshaw 1977). The fossil record of parrots is extremely scarce, with very few Tertiary forms known so far (see below).

In the present paper I will describe a new parrot from the early Miocene deposits of Merkur in western Bohemia, and comment on the nomeclatural and taxonomic identity of some other Tertiary parrots. The stratigraphy follows Mein (1990). Mein's Mammal Neogene zones are abbreviated as MN. The classification of parrots follows Smith (1975).

SYSTEMATIC PALEONTOLOGY

Order Psittaciformes Wagler, 1830

Family Psittacidae Illiger, 1811

Genus *Xenopsitta* gen. n.

Type species. *Xenopsitta fejfari* sp. n.

Diagnosis. Small parrot with short and robust tarsometatarsus, generally resembling the tarsometatarsi of large African parrots (*Psittacus* Linnaeus, 1758, *Poicephalus* Swainson, 1837, and *Coracopsis* Wagler, 1832). Anterio-medial metatarsal groove on tarsometatarsus more broad and long, proximal end of tarsometatarsus narrower than in the latter three genera.

Comparison. The tarsometatarsus resembles the same element of large African parrots of the modern genera *Psittacus, Poicephalus,* and *Coracopsis* (which form the tribe Psittacini sensu Smith 1975) in its general shape, and in lacking the outer proximal foramen. It differs from the tarsometatarsus of all these genera in having (1) proximal end more narrow anterio-posteriorly, (2) anterio-medial metatarsal groove more broad and long, and (3) trochlea for digit 4 differently shaped (in lateral view). The tarsometatarsus of *Xenopsitta* gen. n. differs from the same element of *Archaeopsittacus* Lambrecht, 1933 in having (1) anterio-medial metatarsal groove more broad and long, and (2) in lacking perforated shaft at the insertion point of the hind toe.

The humerus of *Xenopsitta* gen. n. differs from the same element of *Poicephalus*, and agrees with that of *Psittacus* in having the attachment of anterior articular ligament short.

ETYMOLOGY. Formed from the Greek *ξενος*, strange, foreign, and *psitta*, diminutive of the Latin *psittacus*, parrot. Selected in allusion of the apparent scarcity of parrots in the Miocene of Europe. The name is feminine in gender.

REMARKS. *Xenopsitta* gen. n. is closely related to the modern genera *Psittacus*, *Poicephalus*, and *Coracopsis*, and belongs in the tribe Psittacini (sensu Smith 1975). This tribe is currently limited to the Afrotropical region. *Xenopsitta* gen. n. represents the earliest record for the tribe, and also the only record of the tribe outside of Africa.

***Xenopsitta fejfari* sp. n.**

(Fig. 1)

HOLOTYPE. Right tarsometatarsus, damaged on both ends, coll. Fejfar (Praha), uncatalogued.

MATERIAL. Right tarsometatarsus (holotype), distal part of left humerus, and proximal part of right humerus; coll. Fejfar (Praha), uncatalogued. All these bones were collected by O. Fejfar in the 1990s (his field-number 7408).

AGE AND LOCALITY. Early Miocene (MN 3) of Merkur, Cheb County, West Bohemia, Czech Republic (Fejfar & Kvaček 1993, Mlíkovský 1996a).

DIAGNOSIS. As for the genus.

MEASUREMENTS. Tarsometatarsus (holotype): length = 16–17 mm (estimated), distal width = 7.0 mm, minimum width of shaft = 2.5 mm, depth of shaft at the same place = 1.6 mm, humerus: distal width = 6.6 mm, distal depth = 4.5 mm, minimum width of shaft = 4.4 mm, depth of shaft at the same place = 2.7 mm.

ETYMOLOGY. After Oldřich Fejfar (Praha), who collected the fossil, in recognition of his paleontological work on Cenozoic mammals.

REMARKS. Previously, this parrot was provisionally listed as "*Archaeopsittacus*" by Mlíkovský (1996a, b).

COMMENTS ON SOME OTHER FOSSIL PARROTS

The previously known Tertiary record of the family Psittacidae was limited to the early Miocene of Queensland in Australia (Boles 1993), early Miocene of France (Milne-Edwards 1869, Lambrecht 1933), early Miocene of Nebraska (Wetmore 1926), middle Miocene of France (Cheneval in press), and Germany (Heizmann & Hesse 1995), and late Pliocene of Kansas (Becker 1987). An alleged record was reported also from the early Eocene of England (Harrison 1982). Below, I will comment on some of these taxa.

***Archaeopsittacus verreauxii* (Milne-Edwards, 1871)**

The first Tertiary parrot ever described was *Psittacus verreauxii* from the early Miocene (MN 2a) of Saint-Gérand-le-Puy in France. Milne-Edwards (1871: 525), Lydekker (1891: 12), Paris (1912: 286), Lambrecht (1921: 88, 1933: 609), Brodkorb (1971: 210), and Bocheński (1997: 319) stated, that the species was described by Milne-Edwards (1870: 558; page 557 erroneously given by Brodkorb).

The name indeed appears in that work and on that page, but there is no description or indication of the species in that paper. Hence *Psittacus verreauxii* Milne-Edwards, 1870 is nomen nudum, and the name must be credited to Milne-Edwards (1871: 525). The holotype of the species is a tarsometatarsus, figured by Milne-Edwards (1871, pl. 200, fig. 1–6), and probably deposited in the Muséum National d'Histoire Naturelle in Paris, France.

Milne-Edwards (1871) observed, that the holotypical tarsometatarsus of *Psittacus verreauxii* is more similar to the same element of larger African parrots (Psittacini sensu Smith 1975), than to the same element of American parrots (Arini sensu Smith 1975). While the bird indeed seems to belong to the group of the Old World parrots (New World parrots seem to be distinct within the family – Smith 1975), its tarsometatarsus significantly differs from the same bone of the Psittacini (*Psittacus*, *Poicephalus*, *Coracopsis*), Cacatuini (*Cacatua* Viellot, 1817), and Platycercini (*Platycercus* Vigors, 1825, *Psephotus* Gould, 1845) in possessing the outer proximal foramen. In the latter character, *Psittacus verreauxii* agrees with the Lorini (*Eos* Wagler, 1832, *Trichoglossus* Vigors et Horsfield, 1826), and Psittaculini (*Agapornis* Selby, 1836, *Alisterus* Mathews, 1911).

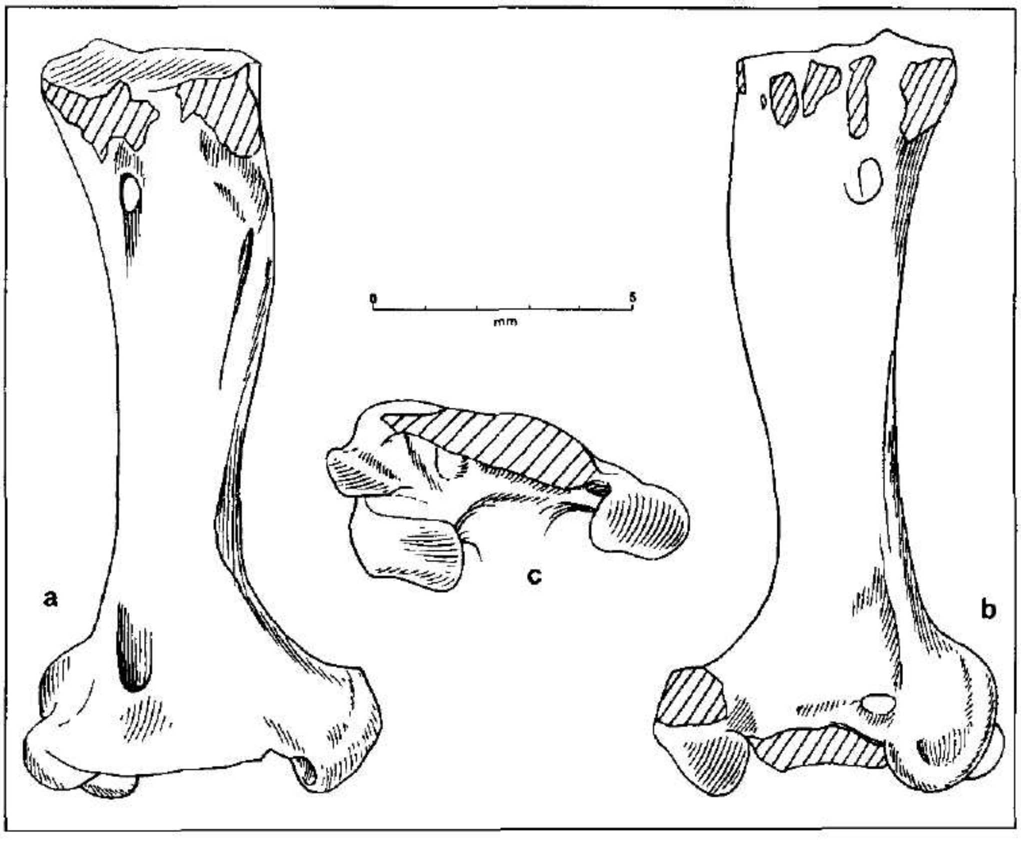

Fig. 1. Holotypical tarsometatarsus of *Xenopsitta fejfari* gen. n. et sp. n. (Aves, Psittacidae) from the early Miocene of Merkur in the Czech Republic: a – anconal view, b – plantar view, c – distal view.

The tarsometatarsus of *Psittacus verreauxi* differs from the Loriini in having hypotarsus with free calcaneal ridges. In all studied members of the Loriini (see Appendix), hypotarsus is highly modified, and forms a single bony ring (in proximal view). I found similar condition also in some Old World genera of parrots, placed by Smith (1975) in other tribes, particularly in *Melopsittacus* Gould, 1840, *Eunymphicus* Peters, 1937, and *Cyanoramphus* Bonaparte, 1854 (Platycercini), *Nymphicus* Wagler, 1832 (Cacatuini), *Psittrichas* Lesson, 1831 (Psittrichasini), *Loriculus* Blyth, 1850, *Agapornis*, and *Bolbopsittacus* Salvadori, 1891 (Psittaculini), and also in all New World parrots (Arini – see Appendix). Ring-shaped hypotarsus was also almost formed in *Psittaculirostris* Gray et Gray, 1859 (Psittaculirostrini), *Micropsitta* Lesson, 1831 (Micropsittini), and in *Psittinus* Blyth, 1842 (Psittaculini). This condition was rather similar in these three less known genera, which may indicate, that they are closer related to each other, than previously assumed. All other genera of Old World parrots, listed in Appendix, had ridged hypotarsus, although the ridges tented to be coosified to some degree.

Summarizing this evidence, it is probable, that *Psittacus verreauxii* belongs in the Psittaculini. Until the taxonomic position of this parrot within the tribe is solved, the bird should be placed in the monotypic genus *Archaeopsittacus*, created by Lambrecht (1933: 609).

***Pararallus dispar* (Milne-Edwards, 1869)**

Milne-Edwards (1869: 155) described from the middle Miocene (MN 6) of Sansan in France under the name *Rallus dispar* a rail species, to which he assigned four bones: proximal part of a tarsometatarsus (his pl. 105, fig. 17–21), distal part of a tarsometatarsus (pl. 105, fig. 17–20, 22), distal part of a tibiotarsus (pl. 105, fig. 27–30), and distal part of a humerus (pl. 105, fig. 23–26; also figured in Cracraft 1973, fig. 15A, B). Lambrecht (1933: 466), Brodkorb (1967: 120), and Cracraft (1973: 33) believed, that these bones form a syntypical series. This led Cracraft (1973: 120) to select the partial humerus (Muséum National d'Histoire Naturelle, Paris, Sa 1201) as the lectotype of the species.

Nevertheless, Milne-Edwards (1869) based his *Rallus dispar* solely on the two tarsometatarsal fragments (as correctly observed already by Lydekker 1891: 144), while he just assigned the other two fragments to the species. Hence, the partial humerus cannot be selected as a lectotype of *Rallus dispar*, and Cracraft's (1973) action is thus not valid from the point of view of the zoological nomenclature (ICZN 1985). Milne-Edwards (1869–1871) apparently believed, that the two tarsometatarsal fragments originated from a single bone. However, Lambrecht (1933: 466) observed, that the distal portion is from the right side of the body, while the proximal end is from the left side of the body. This certainly applies to the figures in Milne-Edwards (1869), but there is no evidence, that one of the figures was not side-reversed by the droughtsman. At least, this seems to apply to the "lectotypical" humerus fragment. The stereo-photograph in Cracraft (1973, fig. 15A,B) shows a left humerus (as correctly stated by Cracraft), while the figure in Milne-Edwards (1869–1871, pl. 105, fig. 22–26) shows a right humerus. Morphological details allow to conclude, that all these figures were based on a single specimen. Without respect to this, it is obvious that no evidence is available that the two tarsometatarsal fragments, upon which Milne-Edwards (1869) based *Rallus dispar*, originated from a single bone. Hence, these two fragments should be deemed to be the syntypes of *Rallus dispar* Milne-Edwards, 1869.

Cheneval (in press) observed, that the supposedly lectotypical fragment of humerus does not belong to a rail (family Rallidae), but to a parrot (family Psittacidae). In belief, that this bone is the name-bearer of *Rallus dispar*, he moved the species from the Rallidae to the Psittacidae. The same applies to the genus *Pararallus*, created by Lambrecht (1933: 466) for *Rallus dispar* Milne-Edwards, 1869 (see also Cheneval 1996). This information was accepted by Mlíkovský (1996b). While a parrot indeed did exist in Sansan, neither the species name *Rallus dispar* Milne-Edwards, 1869, nor the genus name *Pararallus* Lambrecht, 1933 can be applied to it. The form thus remains unnamed. During the last minutes of proof-reading, Mlíkovský (in Mlíkovský & Hesse 1996) erroneously extended the supposed parrot affinities of *Pararallus* to *Pararallus hassenkampi* Martini, 1967 from the early Oligocene of Sieblos in Germany. While the affinities of the latter species are not clear, the remains certainly did not belong to a parrot. There is no evidence, that a parrot was found in Sieblos.

Palaeopsittacus georgei **Harrison, 1982**

Harrison (1982: 205) described from the early Eocene of Walton-on-the-Naze in England a new species of a bird, considered by himself to be the earliest parrot. Olson (1985) questioned the referral of this species to the Psittacidae, and Mourer-Chauviré (1992) transferred it to the Quercypsittidae, created by herself for *Quercypsitta* Mourer-Chauviré, 1992 from the late Eocene of La Bouffie in France. According to my restudy of available illustrations, *Quercypsitta* shows many similarities to the Sandcoleidae Houde et Olson, 1992 from the middle Eocene of Wyoming. Generally, the fossils show a mixture of characters of the Psittacidae and the Coliidae. Whether they were primitive parrots (Mourer-Chauviré 1992), or their similarities to parrots are a result of convergent evolution (Houde & Olson 1992), these birds certainly did not belong in the family Psittacidae.

DISCUSSION

The earliest true parrots were found in the early Miocene of Australia (Boles 1995), Europe (Milne-Edwards 1871, Mlíkovský this paper), and North America (Wetmore 1926). Considering Smith's (1975) classification of the Psittacidae, this record applies to four tribes, incl. the Cacatuini (Australia), Psittacini (Europe), Psittaculini (Europe), and Arini (North America). This means, that parrots were already widespread and diversified in the early Miocene, but the data have little bearing on the phylogenetic history of the family.

In Europe, the Psittacidae were recorded from the early Miocene (MN 2a) of Saint-Gérand-le-Puy in France (*Archaeopsittacus verreauxii*; Milne-Edwards 1871, Mlíkovský this paper), in the early Miocene (MN 3) of Merkur in the Czech Republic (*Xenopsitta fejfari* gen. n. et sp. n.), in the middle Miocene (MN 6) of Sansan in France (unnamed form; Cheneval in press, Mlíkovský this paper), in the middle Miocene (MN 6) of Nördlinger Ries in Germany (unnamed form; Heizmann & Hesse 1995), and in the middle Miocene (MN 7) of Steinheim in Germany (unnamed form; Heizmann & Hesse 1995). There is no evidence for the existence of parrots in Europe in the late Miocene and Pliocene (Mlíkovský 1996b).

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Oldřich Fejfar (Praha) and Zdeněk Dvořák (Bílina, Czech Republic) placed the fossils from Merkur at my disposal. Storrs L. Olson (Washington, D. C.) allowed me to use the comparative collection of avian skeletons under his care. The drawings were kindly prepared by Oldřich Fejfar. I am obliged to all of the named persons. This work was largely done, when I was short-term fellow of the Smithsonian Institution in Washington, D. C., in January/February 1997.

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APPENDIX

List of examined species

Skeletons of modern parrots were studied in the collections of the United States National Museum in Washington, D C , and in the author's collection in Praha In the following list, the supraspecific classification follows Smith (1975) Representatives of all tribes were available for study Usually, only one specimen per species was examined Higher numbers are given in parentheses

Platycercini *Melopsittacus undulatus* (Shaw, 1805), *Neophema elegans* (Gould, 1837), *N pulchella* (Shaw, 1792) (2), *N splendida* (Gould, 1841), *Eunymphicus cornutus* (Gmelin, 1788) (2), *Cyanoramphus novaezealandiae* (Sparrman 1787), *Purpureicephalus spurius* (Kuhl, 1820), *Psephotus varius* Clark, 1910, *Northiella haematogaster* (Gould, 1838), *Barnardius barnardi* (Vigors & Horsfield, 1827), *Platycercus adscitus* (Latham, 1790), *P eximius* (Shaw, 1792)

Cacatuini *Nymphicus hollandicus* (Kerr, 1792) (2), *Callocephalon fimbriatum* (Grant, 1803), *Cacatua alba* (Mueller, 1776), *C galerita* (Latham, 1790), *C sulphurea* (Gmelin, 1788), *C sanguinea* (Gould, 1843), *C leadbeateri* (Vigors, 1831), *C roseicapilla* (Vieillot, 1817), *Calyptorhynchus magnificus* (Shaw, 1790), *Probosciger aterrimus* (Gmelin, 1788) (3)

Nestorini *Nestor meridionalis* (Gmelin, 1788), *N notabilis* (Gould, 1856)

Strigopini *Strigops habroptilus Gray, 1845*

Psittrichasini *Psittrichas fulgidus* (Lesson, 1830)

Lorini *Oreopsittacus arfaki* (Meyer, 1874), *Charmosyna papou* (Scopoli, 1786), *Vini australis* (Gmelin, 1789), *V stepheni* (North, 1908), *Lorius albinuchus* (Rothschild & Hartert, 1924), *L lory* (Linnaeus, 1758), *L garrulus* (Linnaeus, 1758), *Eos squamata* (Boddaert, 1783), *Chalcopsitta atra* (Scopoli, 1786), *Trichoglossus haematodus* (Linnaeus 1771), *T rubiginosus* (Bonaparte, 1850)

Psittaculirostrini *Psittaculirostris edwardsi* (Oustalet, 1885)

Micropsittini *Micropsitta fisnchi* (Ramsay, 1881)

Psittaculini *Loriculus galgulus* (Linnaeus, 1758), *L philippensis* (Muller, 1776), *Agapornis taranta* (Stanley, 1814), *A roseicollis* (Vieillot, 1818), *A fischeri* Reichenow, 1887, *A swinderiana* (Kuhl, 1820), *A cana* (Gmelin, 1788), *Aprosmictus erythropterus* (Gould, 1865), *Alisterus scapularis* (Liechtenstein, 1818), *Polytelis swainsonii* (Desmarest, 1826) (2), *P anthopeplus* (Lear, 1831), *Prosopeia tabuensis* (Gmelin, 1788), *Geoffroyus geoffroyi* (Bechstein, 1811), *Eclectus roratus* (Mueller, 1776) (2), *Bolbopsittacus lunulatus* (Scopoli, 1786), *Psittinus cyanurus* (Forster, 1795), *Prioniturus montanus* Ogilvie-Grant, 1895, *Tanygnathus megalorhynchos* (Boddaert, 1783) *T lucionensis* (Linnaeus, 1766), *Psittacula eupatria* (Linnaeus, 1766), *P krameri* (Scopoli, 1769)

Psittacini *Psittacus erithacus* Linnaeus, 1758 (3), *Coracopsis vasa* (Shaw, 1812), *C nigra* (Linnaeus, 1758), *Poicephalus senegalus* (Linnaeus, 1766) (2), *P meyeri* (Cretzschmar, 1827) (2), *P robustus* (Gmelin, 1788), *P gulielmi* (Jardine, 1849)

Arini *Bolborhynchus lineola* (Cassin, 1853) (2), *Forpus coelestis* (Lesson, 1847), *F cyanopygius* (Souance, 1856), *Brotogeris jugularis* (Mueller, 1776), *B versicolorus* (Mueller, 1776), *Nannopsittaca panychlora* (Salvin & Godman, 1870), *Touit dilectissima* (Sclater & Salvin, 1870), *Pionopsitta haematotis* (Sclater & Salvin, 1860), *Graydidascalus brachyurus* (Kuhl, 1820), *Pionus maximiliani* (Kuhl, 1820), *P menstruus* (Linnaeus, 1766), *Amazona leucocephala* (Linnaeus, 1758), *A farinosa* (Boddaert, 1783) (2), *A guildingi* (Vigors, 1837), *Triclaria malachitacea* (Spix, 1824), *Pionites leucogaster* (Kuhl, 1820), *Deroptyus accipitrinus* (Linnaeus, 1758), *Myiopsitta monachus* (Boddaert, 1783), *Cyanoliseus patagonus* (Vieillot, 1817), *Microsittace ferruginea* (Mueller, 1776) *Pyrrhura hoffmanni* (Cabanis, 1861), *P rhodogaster* (Sclater, 1864), *Ognorhynchus icterotis* (Massena & Souance, 1834), *Rhynchopsitta pachyrhyncha* (Swainson, 1827), *Conuropsis carolinensis* (Linnaeus, 1758), *Nandayus nanday* (Vieillot 1823), *Aratinga holochroa* (Sclater, 1859), *A guarouba* (Gmelin, 1788), *A euops* (Wagler, 1832), *Ara nobilis* (Linnaeus, 1758), *A maracana* (Vieillot, 1816), *A macao* (Linnaeus, 1758), *A militaris* (Linnaeus, 1766), *A ararauna* (Linnaeus, 1758), *A spixi* (Wagler, 1832), *Anodorhynchus hyacithinus* (Latham, 1790)

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Erratum

In an article by J. Mlikovsky (Early Pleistocene birds of Deutsch-Altenburg, Austria. *Acta Soc. Zool. Bohem.* **62**: 135–141, 1998) a right carpometacarpus from Deutsch-Altenburg 4B was erroneously listed as belonging to *Palaeocryptonyx donnezani*. In fact, the bone belongs to *Perdix perdix*. By this, the overall number of bird species from Deutsch-Altenburg is increased to 15, and the minimum number of individuals from Deutsch-Altenburg 4B to 22. Proportion of MNI's in the Table 1 in Mlikovsky (1998) must be changed accordingly. The carpometacarpus of *Perdix perdix* was originally identified as belonging to *Francolinus capeki* by Janossy (1981), and remains unfigured.

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Results of the Czech Biological Expedition to Iran. Part 3*). Coleoptera: Glaphyridae and Scarabaeidae: Sericinae

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Abstract. Distribution data for 14 species of Glaphyridae and 3 species of Scarabaeidae: Sericinae, collected during the Czech Biological Expedition Iran 1996, are presented. *Pygopleurus zagrosensis* sp. n. (Glaphyridae) and *Maladera (Aserica) hodkovae* sp. n. (Scarabaeidae: Sericinae) both from the Boyerahmad-va-Kuhgiluyeh province are described and compared with related species; differential diagnosis of new species is based predominantly on morphology of aedeagus and female genital valvules in the former species and of aedeagus in the latter species. Female of *Pygopleurus mardiensis* Baraud, 1989 is described for the first time. *Omaloplia labrata* (Burmeister, 1884) (Sericinae) is new for Iran.

Taxonomy, new species, distribution, Coleoptera, Scarabaeoidea, Glaphyridae, Sericinae, Palaearctic region

INTRODUCTION

Distribution and taxonomy of Irani Glaphyridae and Sericinae is only poorly understood so far. Only a restricted number of more or less extensive publications providing alfa-taxonomical and distributional data of these scarabaeoid groups is available (e.g., Baraud 1965, 1968, 1971, 1989, 1990a, b, Medvedev 1952, 1960, Petrovitz 1965, 1969, 1971, 1980, Reitter 1903).

Thanks to organizational efforts of Dr Zdena Hodková of Prague, the Czech Biological Expedition Iran 1996 took place between April 20 and May 20, 1996 (for details see Frynta et al. 1997). The present paper is the 3rd part of papers dealing with data resulting from collecting endeavour of members of this expedition. Two previous parts are devoted to amphibians and reptiles (Frynta et al. 1997) and to scorpions (Kovařík 1997).

MATERIAL AND METHODS

The material is deposited in the collections of David Král (DKCP), Milan Nikodým (MNCP) and of the Muséum d'Histoire naturelle, Genève, Suisse (MHNG).

Exact label data are cited for all material. Transliteration of local Irani names was adopted from Shenasi (1995). For detailed identification of localities including map and habitat descriptions see Frynta et al. 1997. Specimens of newly described species are provided with one red printed label: "Name of a taxon sp. n., HOLOTYPUS, ALLOTYPUS or PARATYPUS with No and sex symbol for male or female, Milan Nikodým & David Kral det. 1998".

Authors' remarks and complementations are found in square brackets, x/y – number of males/females collected.

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*) for Part 2 see *Acta Soc. Zool. Bohem.* **61**: 39–52

SPECIES ACCOUNT

Glaphyridae

***Eulasia* (*Eulasia*) *naviauxi* (Baraud, 1971)**

Material examined IRAN, prov Fars, 8 km SWW QADER ABAD vill by road [30°14'N 52°12'E], ca 2100 m 28–29 4 1996, David Kral lgt , 1/0 collected from under stone on open pasture (DKCP) IRAN, prov Fars, Pasargat env [30°12'N 53°10'E], ca 1800 m, 29 4 1996, David Kral lgt , 17/21 specimens collected from yellow flowers of Asteraceae (13/17 DKCP, 2/2 MHNG, 2/2 MNCP)

Distribution Only the type series from Shiraz (SZ Iran) was so far known (Baraud 1971, 1990a)

***Eulasia* (*Eulasia*) *nitidinatis* Baraud, 1990**

Material examined IRAN, pr Lorestan, Zagros mts , 30 km W Khorram Abad, GHOLAMAN vill env [33°25'N 48°12'E] 1000 m, 6–7 5 1996, David Král lgt , 6/38 collected from various flowers (Asteraceae, Apiaceae, *Papaver*, etc) in a clear oak forest (3/27 DKCP, 1/3 MHNG, 2/8 MNCP)

Distribution Only the holotype labelled "Iran, Sultanieh, Zandjan-Teheran, 16 VI " (Baraud 1990a) was so far known First record from the Lorestan province

***Eulasia* (*Rudeulasia*) *carinata* Baraud, 1990**

Material examined IRAN, prov Fars, Zagros mts , ca 1000 m, ABSHAR vill env [30°23'N 51°30'E], 2–3 5 1996 David Kral lgt , 4/5 collected from *Papaver* sp , open habitat (field margin) (2/3 DKCP, 1/1 MHNG, 1/1 MNCP)

Distribution Only the holotype labelled "Perse, Beni Laan, Escalera IV–1899" (Baraud 1990) was so far known The type locality, probably correctly "Beni Lam" region (Andrees Handatlas 1896), is situated along the border between Iraq and the Irani province Ilam First record from the Fars province
Remarks The species was collected syntopic with the closely related *A* (*R*) *genei*

***Eulasia* (*Rudeulasia*) *genei* Truqui, 1848**

Material examined IRAN prov Fars, Zagros mts , ca 1000 m, ABSHAR vill env [30°23'N 51°30'E], 2–3 5 1996, David Kral lgt , 4/0 collected from *Papaver* sp , open habitat (field margin) (DKCP) IRAN, pr Lorestan, Zagros mts , 30 km W Khorram Abad, GHOLAMAN vill env [33°25'N 48°12'E], 1000 m, 6–7 5 1996, David Kral lgt , 5/7 collected from various flowers (Asteraceae, *Papaver* sp) in clear oak forest (2/4 DKCP, 1/1 MHNG, 2/2 MNCP)

Distribution E Mediterranean broadly distributed species in Syria, Jordan, Israel, Palestine, Iran (Baraud 1990a, Giachino 1982)

***Eulasia* (*Rudeulasia*) *pulchra* (Reitter, 1890)**

Material examined IRAN, pr Lorestan, Zagros mts , 30 km W Khorram Abad GHOLAMAN vill env [33°25'N 48°12'E] 1000 m 6–7 5 1996, David Kral lgt , 11/14 collected from various flowers (Asteraceae, Apiaceae, *Papaver* sp , etc) in clear oak forest (7/10 DKCP, 2/2 MHNG, 2/2 MNCP)

Distribution E Mediterranean rarely collected species in E Turkey and W Iran (Baraud 1990a)

Eulasia (*Rudeulasia*) *straussi* (Ganglbauer, 1905)

MATERIAL EXAMINED IRAN, pr Lorestan, Zagros mts , 30 km W Khorram Abad, GHOLAMAN vill env [33°25'N 48°12'E], 1000 m, 6 –7.5 1996, David Král lgt ; 25/29 collected from various flowers (Asteraceae, Apiaceae, *Papaver* sp, etc) in clear oak forest (16/20 DKCP, 4/4 MHNG, 5/5 MNCP)

DISTRIBUTION. E Mediterranean: E Turkey, Iraq, Iran (Baraud 1990a). Rarely collected species, probably vicariant to the closely related and more to the west and the south distributed *E.* (*R.*) *fastuosa* (Reitter, 1890).

Glaphyrus festivus Ménétriés, 1836

MATERIAL EXAMINED IRAN, pr. Lorestan, Zagros mts., 30 km W Khorram Abad, GHOLAMAN vill env [33°25'N 48°12'E], 1000 m, 6.–7 5 1996, David Král lgt , 1/0 under stone (DKCP)

DISTRIBUTION. Armenia, Nakhichevan, E Turkey, NW Iran (Medvedev 1960).

Glaphyrus onopordi Reitter, 1903

MATERIAL EXAMINED. IRAN, prov. Khuzestan, CHOQA-ZANBIL env. (zikkurat) [32°00'N 48°31'E], ca 100 m, 5 – 6 5 1996, D. Král lgt ; 3/4, collected from flowers of thistles (2/3 DKCP, 1/1 MNCP).

DISTRIBUTION. Iran (Medvedev 1960), so far only few records, very rarely collected species.

Glaphyrus sp. 1

MATERIAL EXAMINED. IRAN, prov Khuzestan, CHOQA-ZANBIL env (zikkurat) [32°00'N 48°31'E], ca 100 m, 5 – 6 5 1996, D Král lgt ; 3/1 collected from flowers of thistles together with preceding species (2/1 DKCP, 1/0 MNCP)

REMARKS. Related to *Glaphyrus micans* Faldermann, 1835 (metallic coloured species, antennal club shorter than antennomeres II–VII combined, setation of pronotum and head short and light, lateral pronotal margin bordered only nearly posterior angles, smooth impunctate pronotal areas present, protibia in basal half externally remarkably serrate, ventral setae of metatarses yellow). Four other species, probably closely related to *G. micans*, were described from Iran: *G. laufferi* Reitter 1903: 132 based on two males from "Baktyari (Tombol)", *G. persicus* Pic, 1947a: 5 based on a single female from "Perse", and *G. incertus* (single female) and *G. purpureus* (single male), both described by Pic, 1947b: 2 also from "Perse". Unfortunately descriptions of these four species are very short and totally unsufficient. Therefore it is necessary to study Reitter's and Pic's type material for correct identification of the material under study.

Glaphyrus sp. 2

MATERIAL EXAMINED IRAN, prov. Bushehr, 15 km NW Bandar-e-Gonaveh, CHAHAK vill. env. [29°40'N 50°25'E], ca 50 m, 3 –5 5 1996, David Král lgt , 0/5 collected from flowers of thistles (0/4 DKCP, 0/1 MNCP).

REMARKS. See remarks under *Glaphyrus* sp. 1.

Pygopleurus cyanescens (Reitter, 1890)

MATERIAL EXAMINED IRAN, prov Zanjan, 50 km NNE of AVAJ by road to Takestan [35°40'N 48°45'E], ca 1800 m, 8 5 1996, David Král lgt , 0/1 collected from *Papaver* sp , open pasture along a stream (DKCP)

DISTRIBUTION. E Mediterranean: Azerbaijan, Armenia, E Turkey, N Syria (Baraud 1989); Iran: Tabriz (Baraud 1968). First record from the Zanjan province.

Pygopleurus mardiensis Baraud, 1989
(Figs 6–7)

MATERIAL EXAMINED IRAN, prov Mazandaran, Alborz mts., N slopes, VALI ABAD vill. env [36°14'N 51°18'E], 1800–2500 m, 8–10 5 1996, David Král lgt, 1/0 on various flowers, open habitat (DKCP) IRAN, prov Mazandaran, Alborz mts, N slopes, CHALUS env. [36°28'N 51°24'E], 800–0 m, 10.5 1996, David Král lgt., 3/2 on various flowers, open habitat (2/1 DKCP, 1/1 MNCP)

DIAGNOSTICAL CHARACTERS OF FEMALE. Body length 13–14 mm. Head and pronotum green-cuprous, with almost black and light brown setae. Elytron unicolorous brown with darkened, green lustrous external margin; setation consisting of recumbent and erected, black and light brown setae. Legs dark with green lustre, tibiae and tarses only with light setation. Propygidium and pygidium black with light brown setation. Clypeus with rounded anterior angles and rounded lateral contours and with distinct longitudinal keel. Pronotum with anterior and posterior angles rounded; surface covered with distinct and regularly spaced vermicular wrinkles. Sutural angle of elytron obtuse but distinct, posterolateral angle simply arcuate. Protarsal claw short, strongly curved. For genital valvules see Figs 6–7.

DISTRIBUTION. So far known only from the type series (2 males) collected in the Mazandaran province (Iran) (Baraud 1989). Distribution probably restricted to the Hyrcanian zoogeographical region.

Pygopleurus psilotrichius (Faldermann, 1835)

MATERIAL EXAMINED. IRAN, prov Mazandaran, Alborz mts, N slopes, CHALUS env [36°28'N 51°24'E], 800–0 m, 10.5.1996, David Král lgt, 7/6 on various flowers, open habitat (3/2 DKCP, 2/2 MHNG, 2/2 MNCP)

DISTRIBUTION. Eastern Mediterranean: E Turkey, Jordan, Armenia, Georgia, Turkmenistan and N Iran (Baraud 1968, 1989, Nikolaev 1987).

Pygopleurus zagrosensis sp. n.
(Figs 1–5)

TYPE MATERIAL. Holotype (male), allotype (female) and 10 paratypes (No 1–7 males, Nos 8–10 females), labelled IRAN, Zagros mts, 1800–2500 m, pr. Boyerahmad-va-Kuhgiluyeh, Kuh-e-Dinar ridge, 10 km NE of YASUJ [30°39'N 51°36'E], D Král lgt 1–2/5 1996 Holotype, allotype and paratypes Nos 1–3 and 8 in MNCP, Nos 4 6 and 9 in DKCP and Nos 7 and 10 in MHNG.

DESCRIPTION. Body length 10–11 mm (holotype – 10 mm, allotype – 11 mm).
Male. Head, pronotum and scutellum green to cuprous with golden lustre; setation consisting of white-grey and black setae. Elytron light brown, lateral and sutural margin black-green, without purple lustre, recumbent setae in the anterior half almost completely black, posteriorly gradually becoming yellow-black, apically only yellow; erect setae mostly black, posteriorly in sutural area yellow. Propygidium basally dark, anterior third yellow-red as in pygidium; dark area of propygidium with dark setation; yellow-red areas of both pygigium and propygidium with yellow setation. Femora and tibiae black, with strong green lustre, covered with yellow setae; tarses black, with green lustre, setation consisting of light and dark setae. Abdominal sternites with dense grey setation.

Labrum anteriorly slightly emarginate. Anterior margin of clypeus straight, anterior angles and lateral margin rounded; surface covered with coarse and dense punctures except for medial gibbosity; longitudinal keel absent. Pronotum with broadly rounded anterior and posterior angles, broadest in posterior third; basal margin straight medially; surface covered with fine in some areas rather indistinct vermicular wrinkles. Elytron apically cut off, sutural angle obtuse but distinct, posterolateral angle rounded. Protarsal claw short and strongly curved.

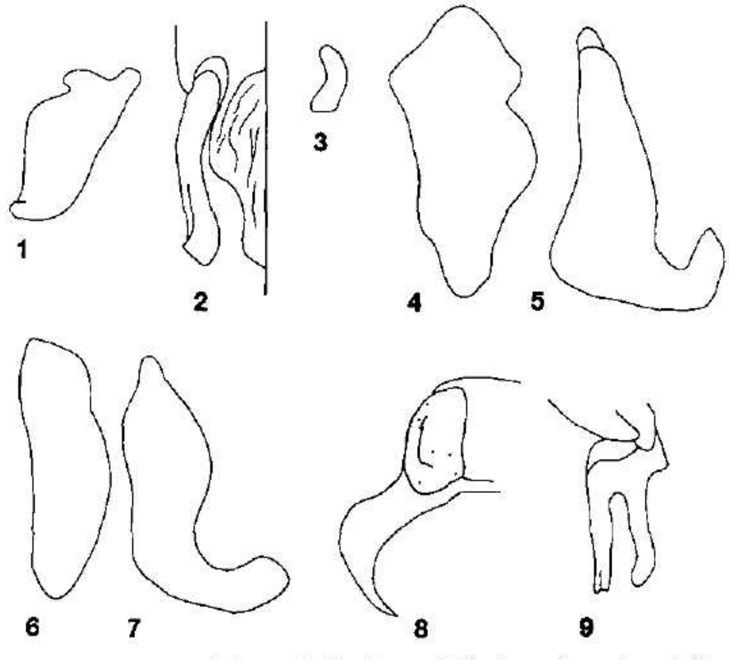
Aedeagus as in Figs 1–3.

Female differs from male as follows: head, pronotum and scutellum green-purple; elytron in basal third brown, two apical thirds black, humeral umbones darkened; longitudinal keel of clypeus present; elytron apically, with sutural denticle. For genital valvules see Figs 4–5.

COLLECTION CIRCUMSTANCES. All specimens were collected from yellow flowers of Asteraceae in a clear oak forest.

NAME DERIVATION. Derivate from its occurrence in the Zagros Mts. in Iran.

DIFFERENTIAL DIAGNOSIS. According to Baraud (1989) pronotum covered with vermicular wrinkles, apex of elytron in both sexes cut off and with sutural denticle in female classify the new species as a member of species group II of *Pygopleurus* Motschulsky, 1859. Similar shape of aedeagus to the new species (Figs 1–3) can be found in *P. besucheti* Baraud, 1989 (Baraud 1989: fig. 20) and in *P. cirrius* (Petrovitz, 1957)(Baraud 1989: fig 11). But the former species exhibits elytral apex regularly rounded and it is known from Israel, the latter have pronotum entirely shagreened, without vermicular wrinkles and it is described from Iraq. *P. zagrosensis* sp. n. can be distinguished from other known species of the species group II according to the following modified key by Baraud (1989):



Figs 1–9 *Pygopleurus zagrosensis* sp. n , holotype (1–3), allotype (4–5); *P. mardiensis* Baraud (Iran. Chalus env.) (6–7), *Maladera (Aserica) hodkovae* sp. n., holotype (8–9) Left paramere (1–3, 9); dorsal sclerite of left genital valvule (4, 6), ventral sclerite of the same (5, 7), right paramere (8) Dorsal view (2, 4–7), lateral view (1, 8–9), frontal view (3)

Key to males of *Pygopleurus* species group II

1 (2) Protarsal claw long and only finely curved. W Turkey .... *P. labaumei* (Petrovitz, 1971)
2 (1) Protarsal claw short and strongly curved
3 (4) Clypeus finely punctate. S Turkey .... *P. monticola* (Petrovitz, 1964)
4 (3) Punctation of clypeus dense and more coarse
5 (6) Apex of elytron obliquely cut off, sutural denticle present. Greece............ *P. apicalis* (Brullé, 1832)
6 (5) Apex of elytron straightly cut off, sutural denticle present or absent
7 (8) Apex of elytron with distinct sutural denticle. Balkan peninsula, W Turkey ... *P. hirsutus* (Brullé, 1832)
8 (7) Sutural denticle absent
9 (10) Elytron brown with blue black apex. Turkey (Hatay), Syria .... *P. ressli* (Petrovitz, 1963)
10 (9) Elytron entirely brown
11(12) Labrum anteriorly straight. Pronotum distinctly coarsely wrinkled. Setation of metatibia consisting of pale and dark setae. Body length 15 mm. Caucasus. .... *P. transcaucasicus* (Petrovitz, 1962)
12(11) Labrum anteriorly slightly emarginate. Pronotum finely and in some specimens only indistinctly wrinkled. Setae of matatibia only pale. Body length 10–11 mm. Iran (Zagros Mts.). .... *P. zagrosensis* sp. n.

Key to females of *Pygopleurus* species group II

1 (2) Apex of elytron strongly angustate. Syria, Israel, Iran, Iraq, Jordan. .... *P. syriacus* (Linnaeus, 1758)
Greece. .... *P. apicalis*
2 (1) Apex of elytron only slightly angustate
3 (4) Pronotum reddish-cupreus, elytron unicolorous with indicated blue-black spot apically. S Turkey. .... *P. monticola*
4 (3) Pronotum opaque or slightly shiny, of different colour.
5 (6) Elytron unicolorously brown, rarely with blue-green sutural strip or with blackish apex. Balkan peninsula, W Turkey .... *P. hirsutus*
Caucasus. .... *P. transcaucasicus*
W Turkey. .... *P. labaumei*
6 (5) Elytron distinctly bicolorous
7 (8) Clypeal sides parallel posteriorly, pronotum violet, elytron black-green with large ligth humeral area (male unknown). Syria .... *P. bimaculatus* (Redtenbacher, 1850)
8 (7) Clypeal sides rounded, pronotum of different colour, at least anterior third of elytron brown
9(10) Basal margin of pronotum medially (aggainst scutellum) slightly emarginate, pronotal setation yellow intermixed with several black setae, posterior third of elytron black-green, protarsal claw long, only slightly curved. Body length 13–14 mm. Turkey (Hattay), Syria .... *P. ressli*
10(9) Basal margin of pronotum medially (aggainst scutellum) straight, pronotal setation consisting of white-grey setae intermixed with black ones, humeral umbones darkened, more than posterior elytral third black, protarsal claw short, strongly curved. Body length 10–11 mm. Iran (Zagros Mts.) .. *P. zagrosensis* sp. n.

Scarabaeidae: Sericinae

***Maladera* (*Aserica*) *hodkovae* sp. n.**

(Figs 8–9)

TYPE MATERIAL. Holotype (male), allotype and 2 paratypes (No 1 – male, No 2 – female), labelled: IRAN, Zagros mts., 1800–2500 m, pr. Boyerahmad-va-Kuhgiluyeh, Kuh-e-Dinar ridge, 10 km NE of YASUJ [30°39'N 51°36'E], D. Král lgt. 1–2/5 1996. Holotype and allotype in DKCP, paratypes in MNCP.

DESCRIPTION. Body length 7.5–7.7 mm (holotype – 7.5 mm, allotype – 7.7 mm). Oval, remarkably convex and shiny species; colour of dorsal surface dark brown to black with dark reddish contours, antennae light yellow-brown, legs and ventral surface dark red-brown, setation yellowish.
Head. Clypeus anteriorly deeply emarginate, anterior angles rounded, sides straight and divergent posteriorly, surface finely shagreened, covered with large, shallow, often fused punctures with indistinct margins and dense fine punctures indicated only anteriorly, several punctures (6–8)

along anterior margin remarkably coarser bearing long erect setae. Frontoclypeal suture finely but distinctly impressed, sinuate. Frons relatively finely and sparsely punctate than clypeus, laterally with several remarkably coarser punctures bearing long erect setae. Eye canthus with evenly arcuate and bordered contour, finely rugose, in posterolateral angle bearing single erect seta. Antenna with 10 antennomeres, antennomere I with long setae, trimerous antennal club as long as antennomeres II–VII combined.

Pronotum strongly convex, transversal, 1.7 times broader than long, broadest basally; anterior angles tapered remarkably over anterior margin, acuteangular with rounded apex, posterior angles obtuseangled with rounded apex, anterior and lateral margins bordered, basal border indicated only medially, punctation double consisting of dense, very fine and almost regularly distributed punctures, mixed with coarse umblilicate, sparser distributed (separated by 3–4 their diameters), almost regularly distributed punctures, bead of anterior angles with several long erect setae.

Scutellum triangulate with rounded apex, basally with several coarse (remarkably coarser than on pronotum), densely spaced punctures, apical third smooth.

Elytron convex, with continuous narrow external membranous margin. Epipleuron extended to obtuseangled posterior angle, apex broadly truncate. Striae subobsolete (indicated laterally and apically), intervals flat; surface covered with double punctation, consisting of dense, very fine and almost regularly distributed punctures, mixed with coarse, umbilicate punctures, associated in irregular strips. Epipleuron with row of long, semierect setae.

Metafemora with two transversal rows of setiferous punctures, discally bare and shiny. Protibia distinctly bidentate, with remarkably developed inferior apical spur. External apical spur of metatibia hardly longer than prometatarsomere.

Abdominal sternites finely shagreened, with transversal row of long, recumbent setae. Punctation of pygidium consisting of dense, coarse, umbilicate, irregularly distributed punctures, apically with several semierect setae.

Aedeagus as in Figs 8–9.

Differential diagnosis. Almost 30 species of the subgenus *Aserica* Lewis, 1895 are currently known from the Eastern Mediterranean and Iran (Baraud 1990, 1992, Keith 1998, Petrovitz 1969, 1971, 1980, Sabatinelli 1977a, b). Their external morphology seems to be considerably uniform and differential diagnoses are mainly based on remarkably different shape of parameres exhibited in every species. Four species, including the new, are known from Iran so far. *Maladera* (*Aserica*) *punctatissima* is probably restricted to the Hyrcanian zoogeographical region and *M.* (*A.*) *baluchestanica* Petrovitz, 1971 is based on a single male from the Baluchestan-va-Sistan province (SE Iran). From both these species, *M.* (*A.*) *hodkovae* sp. n., is distinguished in distinctly different shape of parameres (see Figs 8, 9; Petrovitz 1969: figs 4a, b; 1971: figs 4a, b). Third species, *M.* (*A.*) *farsensis* Petrovitz, 1980, is based on a single female from "Kazeroon" [= Kazerun in the Fars province] and differs from the new species to posses uniformly finely shagreened alutaceous dorsal surface (unique feature within the frame of all so far known *Aserica* species of the Eastern Mediterranean and Iran).

Collection circumstances. All specimens were collected from under stones in clear oak forest.

Name derivation. Matronymic, dedicated to Zdena Hodková of Prague, well-known Czech traveller.

Maladera (*Aserica*) *punctatissima* (Faldermann, 1835)

Material examined IRAN, prov Mazandaran, Alborz Mts , 800–0 m, A slopes, CHALUS env [36°38'N 51°25'E], 10.5.1996, David Král lgt , 1/0 swept from shrubs on open pasture near a stream (DKCP) IRAN, prov Mazandaran, Alborz Mts , N slopes, ca 500 m, 10 km NEE Chorti by road [36°46'N 50°30'E], 10–11 5.1996, David Král lgt , 0/2 collected from under stones in the Hyrcanian forest (DKCP).

DISTRIBUTION Known from northern provinces of Iran (Gilan, Mazandaran and Khorasan) and Turkey (Petrovitz 1969), record from Crete is according to Baraud (1992) doubtful

Omaloplia (*Acarina*) *labrata* (Burmeister, 1884)

MATERIAL EXAMINED *IRAN, prov Fars, Zagros mts , ca 1000 m,* ABSHAR *vill env [30°23'N 51°30'E], 2–3 5 1996,* David Král lgt, 3/4 swept from shrubs of young oaks (2/3 DKCP, 1/1 MNCP)

DISTRIBUTION Eastern Mediterranean Turkey, Syria and Iraq (Mosul) (Baraud 1965) First record from Iran

Acknowledgements

The junior author thanks all the participants of the expedition who provided him with part of above material

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BOOK REVIEW

HENTSCHEL E. J. & WAGNER G. H.: **Zoologisches Wörterbuch. Tiernamen, allgemeinbiologische, anatomische, physiologische Termini und Kurzbiographien.** Sixth revised and expanded edition. Jena: Gustav Fischer Verlag, 1996. 677 pages. Format 120×185 mm. Softbound, price DM 42.– ISBN 3-8252-0367-0.

This zoological dictionary appeared in print in the collection **Uni-Taschenbucher – UTB für Wissenschaft** which joins 13 publishing houses in German-speaking countries: Germany, Austria and Switzerland. First author is professor affiliated with the Friedrich Schiller University in Jena, the second author is university educationalist for agrarian and medical didactics in Berlin. First edition of this publication appeared in print 20 years ago (1976). As emphasized in the preface, students, teachers and practitioners in various branches of applied zoology may be confronted with zoological or biological terms, the definition and explanation of which are easily accessible neither in corresponding textbooks and today's professional journals and references, nor particularly through verbal communication (lectures and the like). Therefore, this word book offers quick and relevant illumination with regard to up-to-day terms.

The preface and contents are followed by instructions for the easy use of this publication.

Chapter 1 provides **introduction to terminology and nomenclature**. Particular subchapters focus on arrangement of zoological disciplines and on origin and evolution of scientific names of animals. Following subchapters discuss phonetics, transcription and style of writing, pronunciation, intonation, syllabification, binding vowels and prefixes and suffixes in compound words, principles of taxonomy, concepts and functions of zoological nomenclature, and an overview of systematic categories and their names. In addition, there are 30 summary-type tables giving in-depth explanation and overviews of topics discussed above.

Chapter 2 incorporates the **basic lexical part** – explanation of zoological names including biological, anatomical and physiological terms. Arranged in alphabetical order, introduced are German and Latin names of diverse zoological taxa, brief biography and bibliography of important zoologists, anatomists and physiologists not omissing distinguished antique physicians. Moreover, introduced are terms used in general biology, comparative anatomy, embryology, histology, cytology, genetics, biochemistry, zoogeography, breeding and parasitology including nosological terms and some selected drugs. Incorporated are about 15 500 entries covering etymological basis of scientific terms and their origin in Greek or Latin.

Chapter 3 offers a **list of authors names**. Here names of about 1500 scientists who have given descriptions of some zoological taxa (genera, species and subspecies) have been situated – together with characterizations of their fields of activity and brief biographical data. This list includes zoologists, parasitologists, anatomists, physiologists, chemists, further on bacteriologists, ecologists, arctic explorers and other investigators.

Chapter 4 presents an overview of the **classification system of the kingdom Animalia**. As stated here, this system has been reduced for didactic and space saving reasons – without introducing orders, classes or intermediary taxonomic levels. Presented overview leans upon the classification scheme promoted by Remane, Storch and Welsch (Kurzes Lehrbuch der Zoologie. Gustav Fischer Verlag, Stuttgart, 1989).

Chapter 5 provides access to **literature** – a comprehensive list of basic textbooks and monographs, to a lesser extent also journal quotations. In conclusion, there is an index of abbreviations and symbols used in this work, and a tabular overview of occurence of important animal groups in divisions of geologic time.

This word book presents a practical pocket-sized manual for pregraduate and postgraduate life and health sciences students and teachers alike.

Jindřich Jira

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Development of thorax in chick embryos with the experimentally produced thoracic ectopia cordis

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Abstract Thoracic ectopia cordis (TEC) was produced in chick embryos on day 3,5 to 4 by a microsurgical impairment of the continuity of the membrana reuniens (MR) To follow the topogenetic movements of the prospective thoracis mesenchyme (PM), the method, permitting formation of lines of India ink particles in living embryonic tissues were used. Long before the formation of thorax the heart reaches a considerable size PM of the thoracic wall components from both sides has to move over it, to meet and fuse in the midline It was found, that the essential morphogenetic movements of the PM (medial and cranial) proceed in embryos with the developing TEC similar to those, observed in normal embryos. But the PM movements in normal development have to undergo slite but crucial ventrolateral deviation around the heart margins The MR, bridging since the onset of its appearance the bulging heart, gives the support and guidance to PM, to cope with the ventrolateral deviation In embryos with the experimentally torn TEC is the ventrolateral deviation of PM movement due to the absence of the mentioned MR functiones prevented. As a result, the heart is gradually displaced ventrally and kept outside the closing thorax Depending on the size and location of the MR defect, different types of TEC develop. Particulars concerning the morphogenetic movements of PM are discussed

Ectopia cordis, thorax, morphogenetic tissue movements, chick embryo, marking

INTRODUCTION

In the range of the 5th to 9th day of the embryonic development (e. d.) of the chick, the anterior body wall quickly differentiates. The bilateral mesenchymal anlagen of the essential thoracic wall components (furcula, coracoid, sternal plate) are approaching each other to fuse in the anterior midline, overlapping the heart (for review see Corning 1925, Portmann 1948, Hamilton 1952, Romanoff 1960, Carlson 1988). Exceptionally the closing parts of the thorax catch the heart outside their place of convergence what results in the development of the TEC.

Whether the primary disturbance is the abnormal development of the heart, the abnormal growth pattern of the body wall or some other factor remains unknown. The greater part of the available literature on TEC consists of casuistic reports or reports of surgeons, attempting to save life of maldeveloped newborn. The latter deal, first of all, with the surgical technics used, describe the range and anatomy of the particular congenital defect and some of them give the up to date statistics of incidency (Millhouse & Joos, 1959, Kaplan et al. 1985, and others). As to the genesis of TEC, conclusions offered by classic monographs are mentioned in discussions which indicate that: "TEC represents an arrest in the development, when heart fails to complete its descent into the thorax" (Taussig 1947), "conditions for the ectopia cordis (EC) development, has to be established very early, when the demarcation between intra- and extraembryonic coelom is being established by the folding of of the body" (Patten 1953), "TEC results from faulty development of sternum and pericardium because of failure of the complete fusion of the lateral folds in the formation of the thoracic wall" (Moore & Persaud 1998).

EC appears, besides other malformations by accident, in experimentally treated chick embryos (Männer et al. 1995, Seidel & Steding 1995, our unpublished observations). Such embryos are usually eliminated from further evaluations. They are only seldom mentioned in results and/or the possible causality of their appearance is rarely analyzed. Jaffee & Jaffee (1997) suppose that "the movements of fluids, brought about by the withdrawal of ovalbumen from eggs, and the subsequent effects of such movements on the positioning of embryos may be the most important factor in the EC genesis". The same authors discuss the possibility of hypoxia-induced osmotic changes to be responsible of EC development. The involvement of the extraembryonic membranes in the development of EC due to a mechanical factor (early rupture of chorion and/or yolk sac, amniotic bands) is suggested by Kaplan et al. (1985).

In our studies concerning the thorax development (Seichert & Seichertová 1996) some embryos developed TEC. According to our suspicion the TEC was introduced by unwilling damage to the membrana reuniens (MR – the term introduced by Rathke (1838) and used in some monographs (Corning 1925) for the fine membrane, developed ventral to the heart loop by the descending head fould, when the embryonic body is folded off from the extraembryonic membranes (see discussion). To test the idea, we decided to develop TEC experimentally under standard conditions by a microsurgical impairment of the continuity of the MR and to study its development.

MATERIAL AND METHODS

Random-bred Brown Leghorns chick embryos (Dobrenice farm, Czech Republic), ranging from the 3.5th to 10th c d were used The standard incubation and window technique were used TEC was produced on c. d. 3.5 to 4 under the stereomicroscope

- The MR was torn by means of microforcepses ventrolateral to the heart as shown in Fig. 1 The size of MR deffect corresponded approximately to the size of right atrium MR was approached either through the incission of the amnion – GROUP I, or after the complete opening and reflection of the amnion – GROUP II
- Some of the treated embryos were marked, to follow the topogenetic movements of the PM – GROUP III The method, permitting formation of lines of India ink particles in living embryonic tissues were used (for details see Seichert 1988) Marks were introduced oblique into the swelling of the anterior body wall into and slightly above the wing bud level (Fig 2) Location of each mark was documented (see below) with comment accurating details (length of the mark, depth of its introduction, if and when the glass carrier was removed) Topogenetic movements of tissues were deduced from deformations and shifts of the originally rectilinear marks and from dispersion of the mark components Results were compared to similarly marked untreated embryos (with intact MR)

After the procedure, windows in the shells were covered with glass, seeled with paraffin and replaced in the incubator Treated embryos were controlled first two days in ovo Selected embryos were sampled either immediate after treatment or in about 12–24 hours intervals of further incubation and treated as follows:

Tab 1 The incidency of TEC in embryos with experimentally torn MR Group I – MR approached through the incission of the amnion Group II – MR torn after reflection of the opened amnion Group III – Embryos treated as group I and marked TEC – Thoracic ectopia cordis N – Normal clossure of the thorax with the heart inside E – Eliminated embryos. either died before 24 hours after the MR incission or died short after the marking

	Group I	Group II	Group III
TEC	43 (86%)	24 (79,9%)	56 (70%)
N	4 (8%)	4 (13,3%)	7 (8,75%)
E	3 (6%)	2 (6,6%)	17 (21,25%)
Total	50 (100%)	30 (100%)	80 (100%)

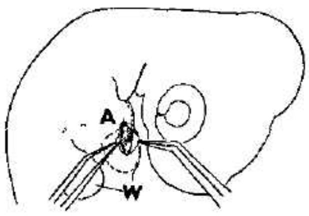

Fig 1 Schematic drawing showing the creation of MR defect and its location A - atrium, W – wing bud

- Fixed in 4% Formaldehyde, microdissected and examined under stereomicroscope (marked treated embryos and marked controlls)
- To visualize the developing skeleton, embryos were fixed for 4–5 days in 70% Ethanol, stained with Alcian Blue, cleared in 1% KOH and mounted in glycerol (modified technique of Lundvall 1927)
- Detection of dead cells in the thoracic wall of the untreated embryos was performed at 12 hrs intervals using vital staining with Neutral Red in Ringer saline 1 1000 applied intraamniotically (e d 5–6) or supravitally (e d 7–8)

  Parts of the anterior body wall of the embryos selected for electron microscopic (EM) examination were fixed in double fixation procedure, using a buffered 3 25% Glutaraldehyde solution followed by buffered 2% Osmium tetroxide and embedded in LR White or Durcupan-Epon mixture Ultrathin sections were examined under the transmission electron microscope TESLA BS 500 at 60 kV Semithin sections (1mm) were stained with 1% Toluidine Blue for topographic orientation and for selection of material for EM investigation

Morphology of the skeleton, distribution of marks and distribution of dead cells were recorded either by photography or using the camera lucida drawings

Some complementary material and results from our previous studies of the normal thorax development (Seichert & Knospe 1992, Seichert & Seichertova 1996) was used (see Fig 10)

RESULTS

The incidency of TEC in embryos with experimentally torn MR was high and was not influenced by the approach to the MR (Table 1)

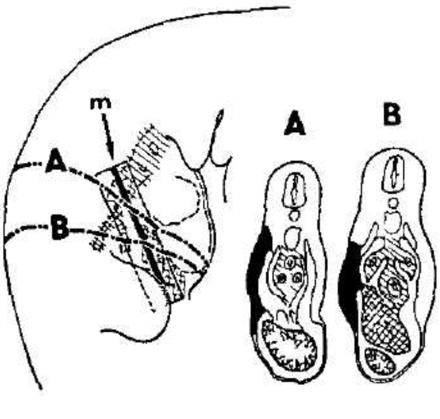

Fig 2 Schematic drawing showing the location of marks (m) introduced oblique into the swelling of the anterior body wall A, A and B, B indicates the approximate extent of the marked body wall mesenchyme in the appropriate transversal section (black fields)

The topography of skeletal components of thorax and shoulder, relative to the heart in embryos with TEC is shown in Fig 3 and is to be compared with the normal conditions shown in the Fig 4

- The essential difference is in the intra- or extrathoracal location of the heart
- Position of the shoulder relative to the vertebral segments do not differ (about the 14th segment in both the malformed and normal embryos)
- Anlagens of the medial extremity of coracoid and of the related part of sternal plate are located behind the lateral heart margin on days 4 and 5 (Fig 4)
- In embryos with developed TEC the main vessels passing in or out of the heart form the vascular stalk connecting the heart with the interior of the closed thorax
- Variable scale of the complete TEC, as to the location of the opening through which the vascular stalk enter the thorax were observed Among them three distinctive types were identified (Figs 3A, B, C)

A – TEC superior, in which the heart was located outside the thorax and the vascular stalk of the heart enteres the closed thorax in the midline, cranial to the sternal clossure In such embryos sampled at later developmental stages the umbiliclike opening for the vascular stalk was very narrow and difficult to identify in cleared specimen stained for the cartilage

B – TEC media The vascular stalk of outside located heart entered the thorax through the opening in the central part of the sternum Seldom developing type, observed in perfection twice only

C – TEC inferior Thorax was closed above the outside located heart In some of such cases the heart was followed by the part of liver

- In the majority of malformed embryos transitory TEC types were observed, differing in the size of the thoracic wall opening and in the extent of outside protruded parts of the heart
- Contrary to the caudal pointing apex cordis in normal embryos, in embryos with TEC, the apex cordis was always turned cranial or at least ventral

Marking experiments of the Group III embryos and the similar markings of untreated embryos (Figs 5–8)

- In general, marks shift medial and cranial, approaching by their ventrocaudal section the midline, or reaching (in treated embryos) the margin of the thoracic wall opening (Figs 5–7)

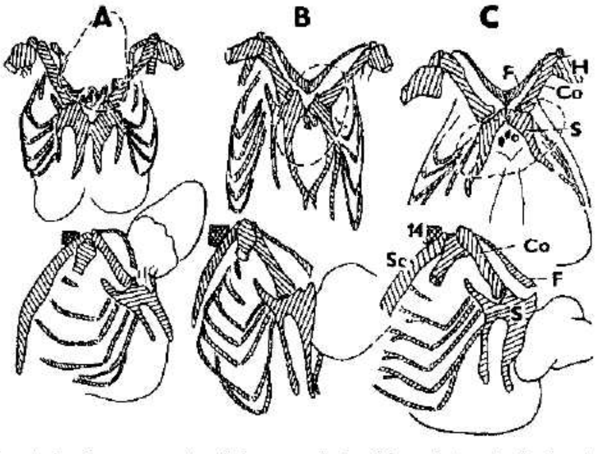

Fig 3 Topography of the skeletal components of thorax and shoulder relative to the heart in embryos with TEC A – TEC superior, B – TEC media, C – TEC inferior Co – coracoid, F – furcula, H – humerus, S – sternal plate, Sc – scapula, 14 – the fourteenth vertebra (representing the corresponding spinal segment)

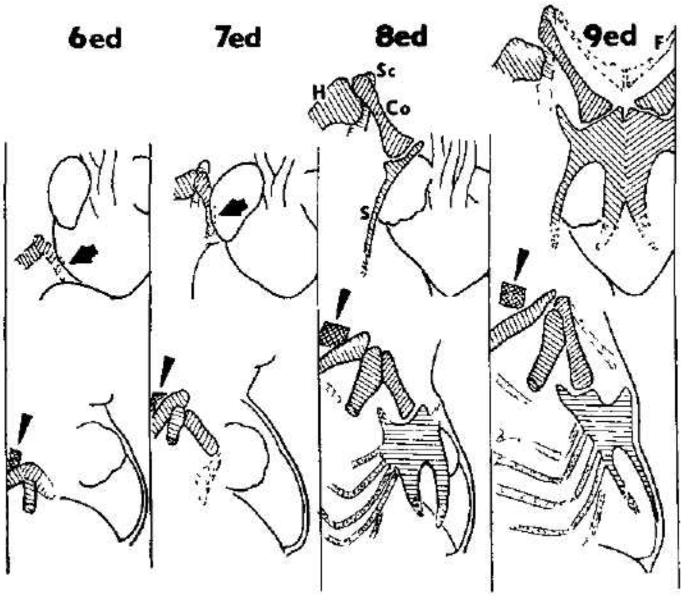

Fig. 4 Topography of the skeletal components of thorax and shoulder relative to the heart in the normal embryos. Arrows indicate the location of anlagens of the medial extremity of coracoid and of the related part of sternal plate behind the lateral heart margins. Arrowheads – the fourteenth vertebra. For further legend see Fig 3

- The original obliquity of marks undergone distinct horizontalisation in their ventrocaudal section (Figs 5A–C and 6C).
- Medial shift is minimal in the cranial section of marks, where dominates the cranial shift (appearance of the neck, see discussion).
- Deformation of the originally rectilinear mark differed in particular cases, depending on the depth into which the mark was introduced: mark components located in the ectoderm and the closely related mesenchyme (the place, where the mark was pricked into the body wall or penetrated through it caudally), undergone higher ascent, than its deeply located components (arrows in Figs 5B–C, 6C and 7A–C).

The zone of fusion of both parts of the thoracic wall components exhibit

- the linear thickening of the ectoderm, visible in the range from the 7th to the 9th e. d. as a white, more or less protruding line – "raphe" (Figs 8A, B).
- The raphe was underlayed by the more condensed strip of mesenchyme, containing higher quantity of phagocytes (Figs 8C and 9), was intesivelly stained with Neutral Red (Fig. 8C) and contained apoptotic cells (Figs 9A, B).

DISCUSSION

– Membrana reuniens: On days 4–5 the heart is covered by the membrane, formed by the internal layer of the descended caudal margin of the head fold. The membrane is continuous with both the somatopleura and amnion, reaching caudally the anterior intestinal portal and Rathke (1838) introduced for the membrane the above used term MR (Vereinigungshaut), which suits perfectly to the functional meaning of the structure. In the sense of the study of Steding & Klemeyer (1969) and

Männer et al. (1995), the membrane corresponds to the internal layer of the pericardial fold, secondarily forming the ventral thoracic wall.

– Morphogenetic movements of the thoracic PM are indicated by the deformation, shift and dispersions of marks (Figs 6, 7 and 10):

— The medial shift of the thoracic PM in the normal development is obvious and generally accepted in all textbooks. Marks, found either near the line of fusion or reaching the margin of the thoracic wall opening (Fig. 6) confirmed the similar shift even in embryos with TEC.

— The cranial shift of the thoracic PM in normal development was documented in our earlier reports (see the legend and diagramatic summarisation in Fig. 10). The result was confirmed by markings of untreated embryos (see the cranially bent anterior segment of the mark in Fig. 5A). In embryos with TEC the shift corresponds with the shift observed in untreated embryos and could be either:

—– deduced from the horizontalisation of the anterior segments of marks, introduced oblique into the swelling of PM (Fig. 5B and C).

—– deduced from the cranial turned apex cordis in TEC superior and from anterior oriented apex cordis in both other TEC types (Figs 3, 5B, 5C, 6A and C): The cranial pressure exerted on the apex cordis by ascending thoracic PM is the supposed mechanism.

— interpolated from the similar position of skeletal parts of the shoulder and thorax skeleton relative to spine segments both in treated and untreated embryos (compare Fig. 3 and Fig. 4). The cranial shift of the shoulder and the thoracic PM in normal embryos has been documented in an earlier report (Seichert & Knospe 1992).

– The ventral shift of the thoracic PM in normal embryos is obvious, as was the medial one. But the realisation of the shift is conditioned by the necessary ventrolateral deviation evident from the location of anlagens of the medial extremity of coracoid and of the related part of sternal plate behind the lateral heart margins (see Fig. 4). The MR, bridging since the onset of its appearance the bulging heart, gives the support and guidance to PM to undergo the ventrolateral deviation in the normal development. In embryos with the experimentally torn TEC the ventral shift was prevented, due to the absence of the mentioned MR functiones.

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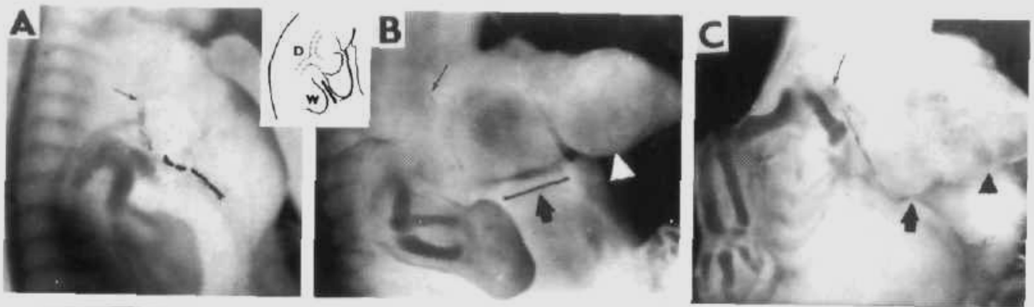
Figs 5–8 Fig 5 (above) A – Normal embryo marked on e. d. 4, sampled three days later and stained for cartilage The length and location of the mark is shown on the schematic drawing (the caudal end of the mark did not reach the ectoderm). The original obliquity of the mark undergone distinct horizontalisation. B, C – Embryos of the Group III, marked and treated further as the embryo shown in A The glass carrier in B (thick arrow) was left in situ Horizontalisation of the mark in B is obvious, in C the horizontalization is indicated by the bent ventrocaudal section of the mark (thick arrow) See the upward rotated apex cordis in B and C (arrowheads). The embryo was partly microdissected Thin arrows indicate, where marks were pricked into the body wall Fig. 6 (middle above). Embryos of the Group III, marked as the embryo shown in Fig. 5A A – Embryo sampled three days after the treatment, B, C – Embryo sampled five days after the treatment, stained for the cartilage and partly microdissected. The marks (arrowheads) reach the margins of the thoracic wall openings Fig 7 (middle below) A – Normal embryo, marked on e. d 4 5 The mark was introduced oblique into the swelling of the anterior body wall, level with the Cuvieri duct (arrow) and penetrated the body wall ventrocaudally in the wing bud level (W) B - The same embryo, sampled four days later and partly microdissected. The heart was pulled slightly to the left to show the deeper located segments of the mark: The point, where the mark was pricked in the body wall appears in the base of the neck (thin arrow) The deepest segments of the mark (arrowheads) are located medial to the distal end of coracoid and entered the septum transversum (compare with C). The caudal segment of the mark bent over the bulging heart, shifting cranioventral and medial. C – Transversal section of the embryo, marked and sampled as the embryo shown in B Arrowheads indicate the mark located in the septum transversum. Fig. 8 (below) A – Normal embryo, sampled at the 8th e. d.: The thickening of the ectoderm in the anterior midline "raphe" is distinct B – Embryo with the developed TEC, sampled at the 8th e. d: The "raphe" is present caudal to the thoracic opening C – Normal embryo, sampled at the 7th e. d: The "raphe" is visualized by the Neutral Red staining.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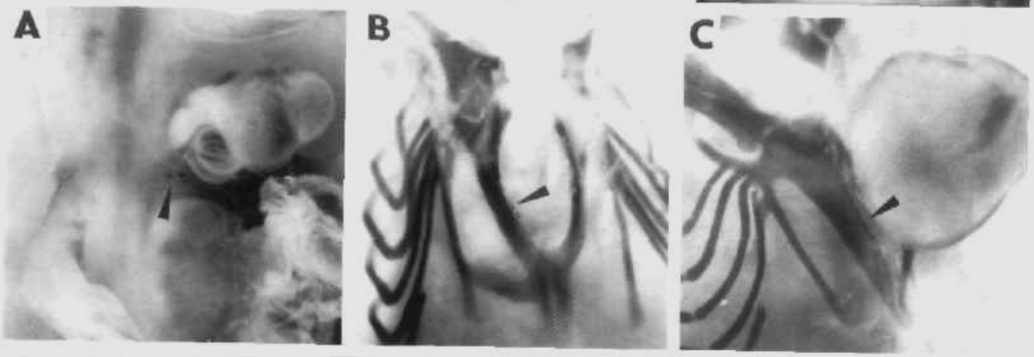
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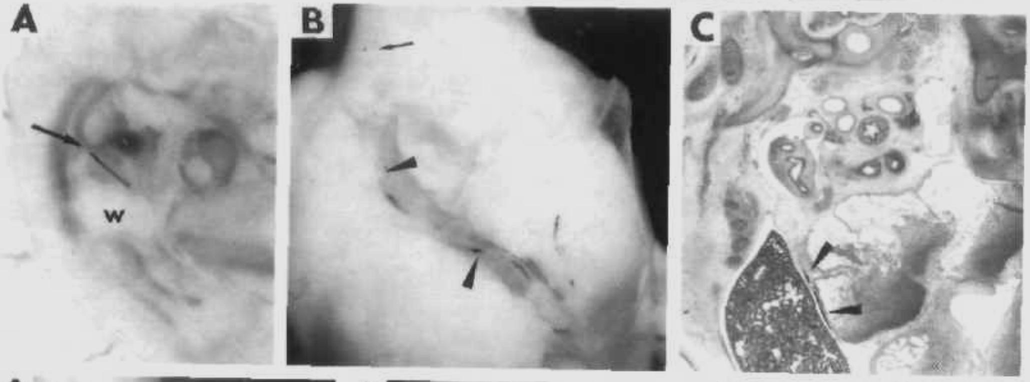
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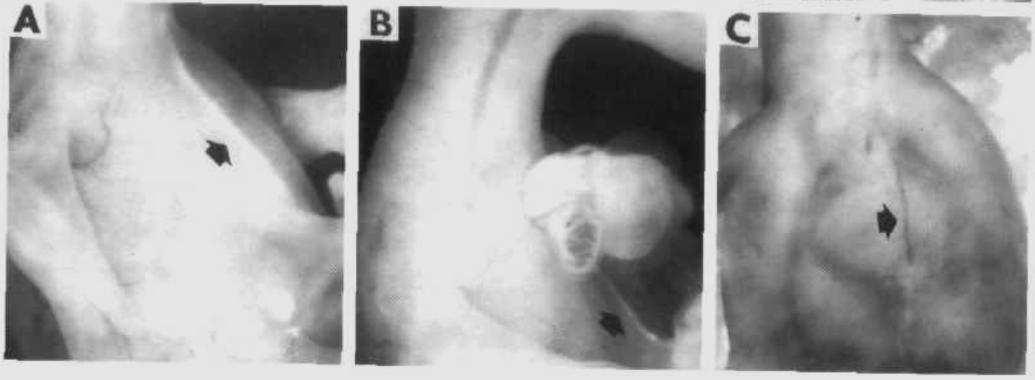
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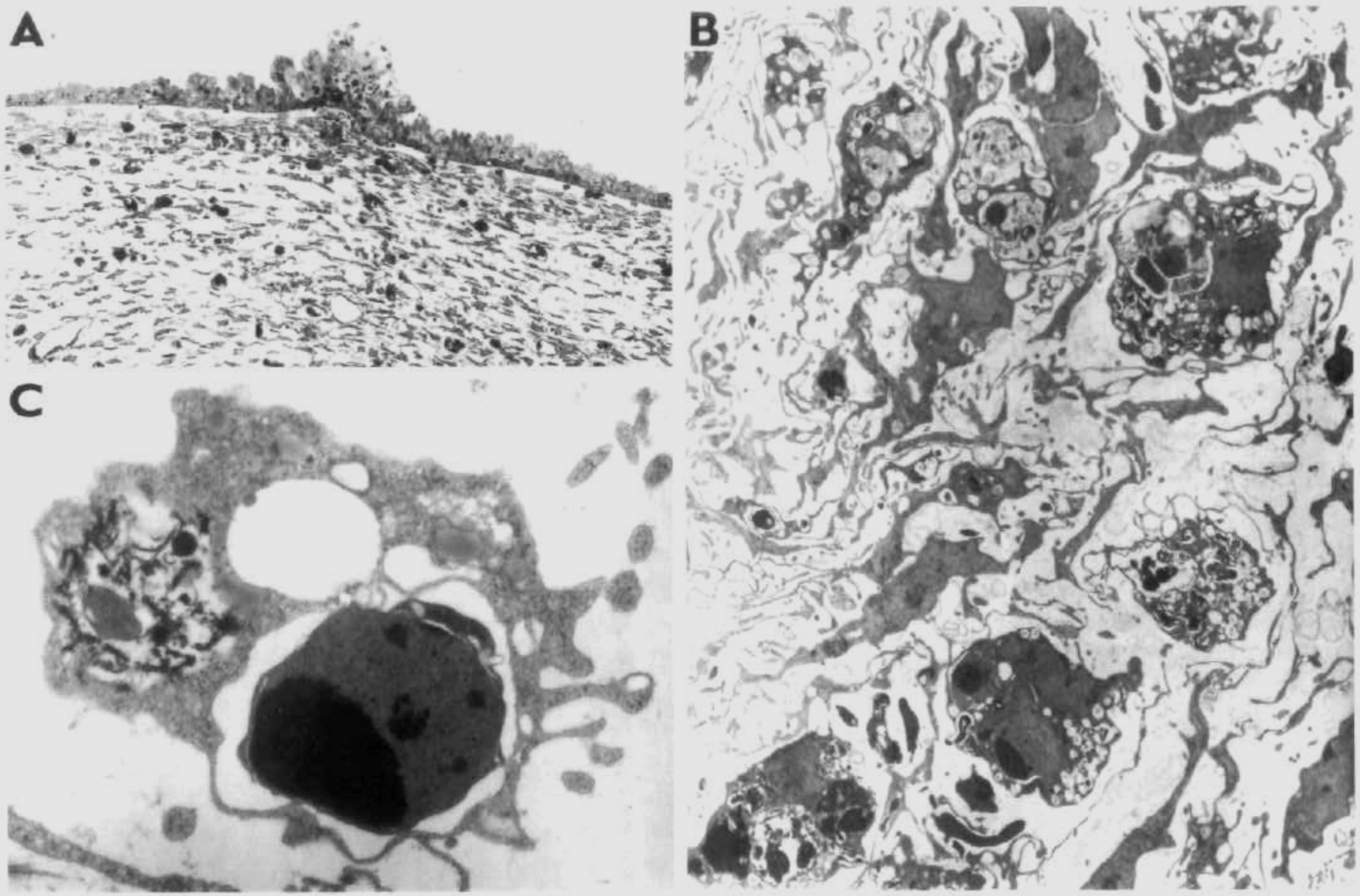
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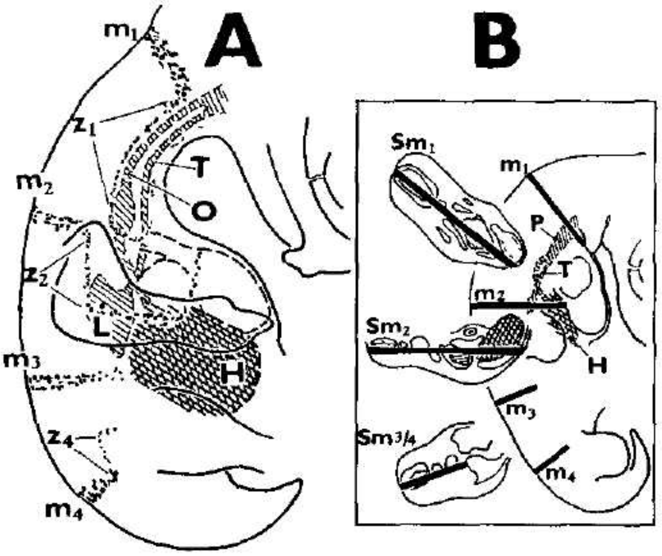

Fig 10 A – Diagramatic summarisation of the morphogenetic shifts involved in the formation of the external shape of the embryonic body (day 7), discussed in the article The diagram is based on studies by Seichert & Knospe (1992), Seichert & Seichertová (1996) and Seichert & Rychter (1997) The approximate location of particular marks (m_1 – m_4) introduced on the 4th day in transversal planes (sections Sm_1 – Sm_4) is shown in B H – hepar, L – lung, O – oesophagus, P – primitive pharyngs, T – trachea, z – lines z indicate the length and direction of the shift of axial organs (represented by the spine) relative to the more ventral located organs The caudal oriented line indicate the cranial shift and the cranial oriented line indicate the caudal oriented shift of the spine The longer is the line – z – the longer is the shift of the particular spine segment

The zone of fusion of the bilateral thoracic wall components is submitted to further study. The presence of numerous dying cells and phagocytes (both in the thickened ectoderm and in the related strip of condensed mesenchyme) indicates, that the physiological cell death (Saunders et al. 1962) eliminates supernumerous cells approaching each other from both sides and mingling in the midline.

Acknowledgements

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Fig 9 A – Semithin transversal section of the anterior body wall (e d 8) in the level of the "raphe" B – Electron micrograph of the mesenchyme in the level of the "raphe" C – Electron micrograph of the phagocyte containing the apoptotic cell

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The first record of *Eremobelba geographica* (Acari: Oribatida) in the Czech Republic with notes on the oribatid communities of selected meadows in southern Moravia

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Abstract. *Eremobelba geographica* Berlese, 1908 was found in three meadows in southern Moravia. This is the first record of this genus in the Czech Republic. The biotopes, and the oribatid communities inhabiting them, are discussed.

Faunistics, ecology, oribatid communities, meadows, *Eremobelba geographica*, Czech Republic

INTRODUCTION

The genus *Eremobelba* was erected by Haller (1884) for the species *E. leprosa* Haller, 1884 from America. Berlese (1908) described the next American species, *E. gracilior*, and two species, *E. geographica* and *E. pectinigera* from Italy. The last mentioned species was transferred to the genus *Ctenobelba* by Balogh (1943). Several other *Eremobelba* species have been described from tropical regions (e. g. *E. capitata* Berlese, 1913 and *E. flexuosa* (Hammer, 1979) from Java, *E. heterotricha* Mahunka, 1977 from southern Asia, *E. wittmeri* (Bayoumi et Mahunka, 1979) from Bhutan, *E. bella* Hammer, 1982 from Bali, *E. comteae* Mahunka, 1988 from Malaysia, *E. balazsi* Mahunka, 1983 from Surinam, Brasilia, *E. piffli* Mahunka, 1985 from Antiles, *E. coronata* Perez-Inigo et Baggio, 1989 from Brasilia, *E. tuberculata* Mahunka, 1982 and *E. graciosa* Mahunka, 1984 from Africa), and *E. minuta* Aoki, 1983 and *E. okinawa* Aoki, 1989 from Japan.

Subias et al. (1990) described the second European species (*E. longisetosa*) from Andalusia (Spain). *E. geographica* has ben recorded in the monographs (Kunst 1969, Krivoluckij 1975) as *E.* cf. *geographica*. Its characteristics, however, seem to be clear (i. e. ornamental configuration of the notogastral tubercles, thin, threadlike sensillus and notagastral chaetotaxy), and distinct from all congeners. *E. longisetosa*, as indicated by its name, possesses very long notogastral setae and, as with many other species, lacks a tubercular network on the notogaster.

In other European findings *E. geographica* has been reported by Balogh (1943) from Hungary and by Olszanowski et al. (1996) from Poland. Krivoluckij (1975) reported it from the Crimea.

This paper reports the first record of *E. geographica* in the Czech Republic, on the biotopes inhabited by this species and on their overall oribatid communities at all.

MATERIAL AND METHODS

Soil cores (approx. 500 ccm) were randomly sampled during investigations of several meadows in southern Moravia (December 1996). They were extracted in Berlese-Tullgren funnels into 80% ethylalcohol.

Tab. 1. The oribatid species sampled from the moist meadow (Košarska meadow – alliance *Caricion gracilis* dominated by *Phalaris arundinacea*) (abbreviation used: ED – eudominant, D – dominant, J – juvenile, the species are ordered according to their dominance)

Tectocepheus velatus (Michael, 1880)	ED
Oppia spp.	ED
Scheloribates laevigatus (C.L. Koch, 1836)	ED
Ceratozetella minima (Sellnick, 1928)	D
Pantelozetes paolii (Oudemans, 1913)	
Suctobelba sp.	
Haplozetes vindobonensis (Willmann, 1936)	

Several studied meadows were moist, some of them partially inundated. Three of them, however, were drier (see below, items 2–4). The phytocenological characteristics of meadows have been by Tesařova & Fiala (1997).

(1) Košarska meadow near Lanžhot village – alliance Caricion gracilis, with *Phalaris arundinaceae* dominant, on clay loam. This moist meadow adjoins the following one. It is characterized for comparison to the three following meadows (items 2–4) as a model for moist meadows in the region investigated.

(2) Košarska meadow near Lanžhot village – alliance Cnidion venosi, with *Alopecurus pratensis* dominant, on sandy loam, dry.

(3) Nejdecke meadows near Lednice town – alliance Cnidion venosi, with *Cirsium canum* dominant, on clay loam, moderately dry.

(4) Obelisk meadow near Lednice village – alliance Molinion, with *Serratula tinctoria* dominant, on clay loam, dry.

RESULTS

The oribatid communities in the moist meadows were moderately diversified (e.g. 7 oribatid taxa – Tab. 1) and consisted of common grassland dwellers. On the other hand, the soil fauna of the drier sites included both common meadow soil oribatids as well as some rare species (Tabs 2–4). The meadow dominated by *Serratula tinctoria* represented the most interesting and diversified (17 oribatid species) biotope and contained several rare oribatids, e.g. *Podoribates gratus* and *Heterozetes palustris* (Tab. 4).

In the micromycetal communities, some trends to thermotolerance are indicated in these three drier meadows. The fungus *Hormographiella aspergillata* occurred conspicuously in all three meadows. This is the first record from Czech Republic (Marvanová, personal communication, and Marvanova 1997).

Eremobelba geographica inhabited the three drier meadows in spite of their different plantation characteristics. Its abundances were low (1–5 mites per one sample).

Tab. 2. The oribatid species sampled from the dry meadow (Košarska meadow – alliance *Cnidion venosi* dominated by *Alopecurus pratensis*]) (abbreviation used: ED – eudominant, D – dominant, J – juvenile, the species are ordered according to their dominance)

Achipteria coleoptrata (Linnaeus, 1758)	ED
Ceratozetes mediocris Berlese, 1908	ED
Scheloribates laevigatus (C.L. Koch, 1836)	
Nothrus sp.	J
Pantelozetes paolii (Oudemans, 1913)	
Hemileius initialis (Berlese, 1908)	
Eremobelba geographica Berlese, 1908	

Tab. 3. The oribatid species sampled from the moderately dry meadow (Lednice village – Nejdecké meadows – alliance *Cnidion venosi* dominated by *Cirsium canum*). (abbreviation used: ED – eudominant, D – dominant, J – juvenile, the species are ordered according to their dominance)

Galumna elimata (C L Koch, 1841)	ED
Achipteria coleoptrata (Linnaeus, 1758)	ED
Scheloribates laevigatus (C.L Koch, 1836)	ED
Nanhermannia nana (Nicolet, 1855)	
Tectocepheus velatus (Michael, 1880)	
Spatiodamaeus verticillipes (Nicolet, 1855)	
Oppia sp	
Hemileius initialis (Berlese, 1908)	
Ceratozetes mediocris Berlese, 1908	
Anoribatella ornata (Schuster, 1958)	
Eremobelba geographica Berlese, 1908	

DISCUSSION

The genus *Eremobelba* has generally a rather tropical distribution (see Introduction). Only two species (*E. geographica* and *E. longisetosa*) occur in Europe, described from its southern parts. *E. geographica* seems to have expanded northwards (Balogh 1943, Olszanowski et al. 1996) in recent years. Its rare records probably result from its type of distribution or its low abundances in biotopes.

The characteristics of three meadows inhabited by this species appear to confirm its affinity for the moderately dry or dry and warm biotopes, i. e. its xerotolerance. The first record of this mite from the Czech Republic also seems to accord with the first record of *Hormographiella aspergilloides* in the same biotopes (Marvanová, pers. comm., Marvanová 1997).

Although both adjacent meadows (items 1 and 2) were inhabited by common oribatids, *Eremobelba geographica* occurred in the dry one (dominant *Allopecurus pratensis*) only. The other dry

Tab. 4. The oribatid species sampled from the dry meadow (Lednice village – Obelisk meadow – alliance *Molinion* dominated by *Serratula tinctoria*) (abbreviation used: ED – eudominant, D – dominant, J – juvenile, the species are ordered according to their dominance)

Punctoribates punctum (C L Koch, 1839)	ED
Ceratozetes mediocris Berlese, 1908	ED
Brachychthonius sp	ED
Scheloribates laevigatus (C L.Koch, 1836)	D
Malaconothrus gracilis Hammen, 1952	
Punctelozetes paolii (Oudemans, 1913)	
Oppia sp.	
Belba pseudocorynopus Màrkel & Mayer, 1960	J
Spatiodamaeus verticillipes (Nicolet, 1855)	
Gustavia fusifera (C L Koch, 1841)	
Tectocepheus velatus (Michael, 1880)	
Podoribates gratus (Sellnick, 1921)	
Ceratozetes mediocris Berlese, 1908	
Heterozetes palustris Willmann, 1917	
Trichoribates incisellus (Kramer, 1896)	
Trichoribates trimaculatus (C L Koch, 1836)	
Galumna elimata (C L.Koch, 1841)	
Eremobelba geographica Berlese, 1908	

meadow (item 4 – Obelisk) included in their community structure common grassland oribatids as well as *Eremobelba geographica* and several other interesting oribatid species (e g *Anoribatella ornata*, *Podoribates gratus* and *Heterozetes palustris*)

Characteristics such as moisture and vegetation seem to be the most important factors for *Eremobelba geographica* occurrence An outstanding feature of these meadows is variety of their oribatid species and the structure of their communities Therefore, the protection of these meadows seems to be priority

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